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Final Response to BDAT Related Comments Document K071 and K106: Mercury Cell Process Wastes K086 Residues from Ink Production Wastes Containing Cyanide
Volume 1-L

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FINAL
RESPONSE TO BDAT RELATED COMMENTS DOCUMENT

K071 and K106: Mercury Cell Process Wastes
K086: Residues from Ink Production
Wastes Containing Cyanide

VOLUME I-L

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INTRODUCTION

This response to comments document only addresses those comments which were submitted on the proposed land disposal restrictions for those waste codes and general BDAT technologies and issues which relate to Third Third Wastes Treatment Standards.

The commenters presented in this document are grouped according to major concerns of the commenters. This document is comprised of the following sections:

ISSUE CODE 1: General BDAT Aspects
ISSUE CODE 2: D001 - Characteristic Ignitable Wastes
ISSUE CODE 3: D002 - Characteristic Corrosive Wastes
ISSUE CODE 4: D003 - Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
ISSUE CODE 5: D004/D010 - Characteristic Wastes for Arsenic and Selenium and K, P, and U Wastes Containing Arsenic and Selenium
ISSUE CODE 6: D005 - Characteristic Wastes for Barium and P013
ISSUE CODE 7: D006 - Characteristic Wastes for Cadmium
ISSUE CODE 8: D007 - Characteristic Wastes for Chromium
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ISSUE CODE 24: K011/K013/K014 - Acrylonitrile

ISSUE CODE 25: K015 - Still Bottoms from Benzal Chloride

ISSUE CODE 26: K021 - Spent Antimony Catalyst.

(No Comments Were Received for this Waste Code)

ISSUE CODE 27: K046 - WW Treatment Sludges from Manufacturing, Formulating, and Loading of Lead-Based Initiating Compounds

ISSUE CODE 28: K060 - Ammonia Still Lime Sludge.

(No Comments Were Received for this Waste Code)

ISSUE CODE 29: K061 - Electric Arc Furnace Dust

ISSUE CODE 30: K069 - Emission Control Dust/Sludge from Secondary Lead Smelting

ISSUE CODE 31: K071, K106 - Mercury Cell Process Wastes

ISSUE CODE 32: K073 - Chlorinated Hydrocarbon Wastes.

(No Comments Were Received for this Waste Code)

ISSUE CODE 33: K086 - Residues from Ink Formulation

ISSUE CODE 34: K100 - Waste Leaching Solution from Acid Leaching of Emission Control Dust/Sludge from Secondary Lead Smelting

(No Comments Were Received for this Waste Code)

ISSUE CODE 35: Wastes Containing Cyanide

ISSUE CODE 36: K017 - Wastes from the production of Epichlorohydrin

(No Comments Were Received for this Waste Code)

ISSUE CODE 37: K028,K029, K095, K096 - Production of 1,1,1-Trichloroethane

ISSUE CODE 38: Wastewaters containing BDAT Constituents

ISSUE CODE 39: K022 - Wastes from the Production of Phenol/Acetone

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ISSUE CODE 42: K026 - Stripping Still Tails from the Production of Methyl Ethyl Pyridine

(No Comments Were Received for this Waste Code)

ISSUE CODE 43: K083 - Distillation Bottoms from the Production of Aniline

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(No Comments Were Received for this Waste Code)

ISSUE CODE 50: K037

(No Comments Were Received for this Waste Code)

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Commenters are identified by both commenter number and commenter name. Comments within each section of this document have been assigned a sequential comment number.

Issues were obtained from the original comment submittal and were categorized based on the grouping specified above. The Agency's response to each comment follows immediately after the text of the document. For responses related to capacity issues, the reader should review the "Response to Comments Background Document for the Third Third Land Disposal Restrictions Proposed Rule, November 22, 1989. Volume II Capacity Related Comments." For information regarding broad policy questions, the reader is directed to the "Response to Comments Background Document for the Third Third Land Disposal Restrictions Proposed Rule, November 22, 1989. Volume III Policy Related Comments."

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Comment Number: 31-A-1
Docket Number: L012-00025
Commenter: The Chlorine Institute
Issue: Mercury Cell Process Waste
Subissue: Data Submission
Comment:

The Chlorine Institute, Inc. (the "Institute") founded in 1924, is an association of chlorine manufacturers and related companies dedicated to the promotion of safety in the production, packaging, transportation and use of chlorine. The Institute's United States members are responsible for more than 98% of this country's chlorine production, an annual figure of over 11 million tons.

In accordance with the Land Disposal Restrictions for Third-Scheduled Wastes; Proposed Rule dated November 22, 1989 in the Federal Register, The Chlorine Institute is providing new data pertaining to the thermal treatment of K106 wastes.

Attached is a report (original and two copies) entitled, "Test Results for Thermal Desorption Treatment of K106 Chlorine Production Waste" prepared by PEI Associate, Inc., Cincinnati, Ohio in behalf of the Chlorine Institute.

The Chlorine Institute believes this report represents new data concerning the treatability of K106 wastes.

The Chlorine Institute intends to comment separately on the proposed rulemaking.

COMMENT NUMBER: 31-A-1
DOCKET NUMBER: LD12-00025
COMMENTER: THE CHLORINE INSTITUTE
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Data Submission
RESPONSE:

EPA thanks The Chlorine Institute for providing the report entitled, "Test Results for Thermal Desorption Treatment of K106 Chlorine Production Waste". The Chlorine Institute, as well as other commenters, have submitted comments to EPA that reference the results of this report. EPA's responses to these comments are provided in the responses to Subissue 31-B.

Comment Number: 31-B-1
Docket Number: LD12-00069
Commenter: RAYOVAC CORP.
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: THERMAL RECOVERY STANDARD: DEMONSTRATABILITY
Comment:

The EPA proposes to require retorting for high mercury wastes (i.e., 16 mg./kg. or higher) and acid leaching for low mercury wastes (i.e., less than 16 mg./kg.); 54 FR 48440. While the numerical limit selected, 16 mg./kg., may be an appropriate lower limit for retorting of cinnabar, it may not be the appropriate lower limit for any of the many different man-made wastes. The EPA's regulations should be flexible enough to permit the most appropriate technology (e.g., retorting, acid leaching, or something else) for each man-made mercury containing waste, and should not dictate the same technology for all purposes based simply on what works satisfactorily for cinnabar.

COMMENT NUMBER: 31-B-1
DOCKET NUMBER: LD12-00069
COMMENTER: RAYOVAC CORP
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

This commenter, as well as others, believes that thermal recovery has not been adequately demonstrated for high mercury content wastes. (Comments concerning the proposed cutoff limit are addressed in subissue responses 31-G). The commenter's argument is based, to a large extent, on the results of a recent study entitled, "Test Results for Thermal Desorption Treatment of K106 Chlorine Production Waste" that was prepared for The Chlorine Institute by PEI Associates. This study reported significant operational problems and poor elemental mercury recovery when pilot scale retorting experiments of K106 wastes were conducted. The operational problems reported included poor control of temperature in the reaction zone resulting in glazing and agglomeration of the waste and particulate carryover into downstream recovery equipment. Several commenters have attributed the poor results to the high concentration of chloride salts present in K106 that likely interfere with the overall performance.

EPA has carefully reviewed this PEI study and the various comments submitted to EPA concerning the significance of the findings of the report. EPA has determined that the operational and recovery problems experienced can likely be attributed to inadequate furnace design, operational controls, and recovery system design.

Although EPA recognizes that chloride salts can interfere with the performance of the retorter/roaster, EPA also recognizes that their effect can be minimized and controlled through close control of residence time and temperature within the retort unit. Retorting of a mixed waste comprised of 5 percent K106 and 95 percent K071 has been demonstrated in Perry (1974) (see Background Document for full citation). EPA believes that since it is demonstrated that mercury can be removed from this feed material, which has a

COMMENT NUMBER: 31-B-1 (continued)
DOCKET NUMBER: LD12-00069
COMMENTER: RAYOVAC CORP
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

higher concentration of chloride salts (due to the K071 waste) than pure K106, then chloride salts can be prevented from becoming a source of major performance impairment. In addition, Perry (1974) reported that acid pretreating the sludge prior to retorting increased the mercury removal from the waste. The study results indicate that pretreating the waste can improve its amenability to treatment.

The PEI study utilized a rotary kiln furnace for retorting. Perry (1974) also had experimented with a rotary kiln furnace but switched to a multiple hearth furnace because it provided better control over residence time and eliminated short ciruiting problems. Similarly, the McDermitt Mine utilizes a multiple hearth furnace to roast cinnabar (HgS) ores for mercury recovery (USEPA 1989d) and a multiple hearth furnace is used for recovery of mercury from roasting of copper sulfide ores containing 3,700 t0 15,000 mg/kg mercury (Marshal, undated). Also, unlike the PEI pilot plant study, these full-scale plants successfully recover(ed) mercury from their feed materials. All three facilities designed their mercury recovery systems with the mercury condenser(s) between the dust cyclone and the scrubber system not after the scrubber system as was done in the PEI pilot study. PEI provided no details on the design of the actual condenser unit. However, considering the placement of the unit in the recovery system, it is not surprising that no mercury was recovered.

For this final rule, EPA has determined that thermal recovery has been demonstrated for mercury wastes containing mercury at concentrations as low as 260 mg/kg. This revised cutoff standard is based on the lowest mercury concentration in untreated wastes that have been retorted successfully to recover mercury (Perry 1974). In Perry (1974), mercury was recovered from a system that

COMMENT NUMBER: 31-B-1 (continued)
DOCKET NUMBER: LD12-00069
COMMENTER: RAYOVAC CORP
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

used 5 percent K106 and 95 percent K071 as the feed material. Perry (1974) reported mercury removals from the feed material ranging from 98.3 to 99.8 percent. Perry (1974) reported that over 90 percent of the mercury was recovered, and that improvements to the gas scrubbing system would be expected to improve the recovery.

Comment Number: 31-B-2
Docket Number: LD12-00128
Commenter: VULCAN CHEMICALS
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: THERMAL RECOVERY STANDARD: DEMONSTRATABILITY
Comment:

As to the discussion of the thermal treatment of mercury wastes, it is Vulcan's understanding that the Chlorine Institute contracted for research on the thermal treatment or retorting of

K106 wastes and the study demonstrated that the thermal treatment of mercury wastes from the production of chlorine has not been adequately demonstrated and is not technically feasible at this time.

While thermal processing may be suitable technology for the production of mercury from the ore, cinnabar, the thermal treatment of high mercury K106 wastes did not yield any recovered mercury material. The instant proposal also did not indicate that EPA's experiments in the retorting of K071 and K106 yielded any recovered mercury, only that "it shows substantial reductions in mercury mobility."[p.48440] This suggests that there may have occurred a change in the form of mercury contained in the K071 and K106 nonwastewaters but it does not demonstrate any recovery of mercury. Actually, the thermal processing of the K106 nonwastewaters may have converted the insoluble mercury sulfide into the more soluble mercury oxide. Also the lack of recovered mercury in this test strongly suggests that the originally proposed acid leaching BDAT should be retained for all K071 wastes.

COMMENT NUMBER: 31-B-2
DOCKET NUMBER: LD12-00128
COMMENTER: VULCAN CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

This commenter, as well as others, believes that thermal recovery has not been adequately demonstrated for high mercury content wastes. (Comments concerning the proposed cutoff limit are addressed in subissue responses 31-G). The commenter's argument is based, to a large extent, on the results of a recent study entitled, "Test Results for Thermal Desorption Treatment of K106 Chlorine Production Waste" that was prepared for The Chlorine Institute by PEI Associates. This study reported significant operational problems and poor elemental mercury recovery when pilot scale retorting experiments of K106 wastes were conducted. The operational problems reported included poor control of temperature in the reaction zone resulting in glazing and agglomeration of the waste and particulate carryover into downstream recovery equipment. Several commenters have attributed the poor results to the high concentration of chloride salts present in K106 that likely interfere with the overall performance.

EPA has carefully reviewed this PEI study and the various comments submitted to EPA concerning the significance of the findings of the report. EPA has determined that the operational and recovery problems experienced can likely be attributed to inadequate furnace design, operational controls, and recovery system design.

Although EPA recognizes that chloride salts can interfere with the performance of the retorter/roaster, EPA also recognizes that their effect can be minimized and controlled through close control of residence time and temperature within the retort unit. Retorting of a mixed waste comprised of 5 percent K106 and 95 percent K071 has been demonstrated in Perry (1974) (see Background Document for full citation). EPA believes that since it is demonstrated that mercury can be removed from this feed material, which has a

COMMENT NUMBER: 31-B-2 (continued)
DOCKET NUMBER: LD12-00128
COMMENTER: VULCAN CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

higher concentration of chloride salts (due to the K071 waste) than pure K106, then chloride salts can be prevented from becoming a source of major performance impairment. In addition, Perry (1974) reported that acid pretreating the sludge prior to retorting increased the mercury removal from the waste. The study results indicate that pretreating the waste can improve its amenability to treatment.

The PEI study utilized a rotary kiln furnace for retorting. Perry (1974) also had experimented with a rotary kiln furnace but switched to a multiple hearth furnace because it provided better control over residence time and eliminated short ciruiting problems. Similarly, the McDermitt Mine utilizes a multiple hearth furnace to roast cinnabar (HgS) ores for mercury recovery (USEPA 1989d) and a multiple hearth furnace is used for recovery of mercury from roasting of copper sulfide ores containing 3,700 to 15,000 mg/kg mercury (Marshal, undated). Also, unlike the PEI pilot plant study, these full-scale plants successfully recover(ed) mercury from their feed materials. All three facilities designed their mercury recovery systems with the mercury condenser(s) between the dust cyclone and the scrubber system not after the scrubber system as was done in the PEI pilot study. PEI provided no details on the design of the actual condenser unit. However, considering the placement of the unit in the recovery system, it is not surprising that no mercury was recovered.

For this final rule, EPA has determined that thermal recovery has been demonstrated for mercury wastes containing mercury at concentrations as low as 260 mg/kg. This revised cutoff standard is based on the lowest mercury concentration in untreated wastes that have been retorted successfully to recover mercury (Perry 1974). In Perry (1974), mercury was recovered from a system that

COMMENT NUMBER: 31-B-2 (continued)
DOCKET NUMBER: LD12-00128
COMMENTER: VULCAN CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

used 5 percent K106 and 95 percent K071 as the feed material. Perry (1974) reported mercury removals from the feed material ranging from 98.3 to 99.8 percent. Perry (1974) reported that over 90 percent of the mercury was recovered, and that improvements to the gas scrubbing system would be expected to improve the recovery.

Comment Number: 31-B-3
Docket Number: LD12-00129
Commenter: OLIN CHEMICALS
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: THERMAL RECOVERY STANDARD: DEMONSTRATABILITY
Comment:

Olin has great concern with establishing mercury retorting (thermal recovery) as BDAT for mercury wastes. Although retorting may eventually be feasible, there are serious reservations concerning its applicability to these wastes at the present stage of technology development. The November 1989, Background Document states that K106 should be easier to thermally treat than concentrated cinnabar due to the lower mercury concentration in K106 (pg. 3-8). This statement ignores the impact of impurities (e.g., filter precoat) in K106 on the thermal treatment process. USEPA believes that processing this waste under similar conditions to that of concentrated cinnabar mercury ores in a thermal recovery unit would result in the treated material having the same low mercury residual levels (11 to 45 ppm - McDermitt Mine test). Thus, the USEPA assumed that differences in the mercury waste, such as large concentrations of salt (melting point 801°C), and filter aids including diatomaceous earth, etc. in K106 waste solids, for example, would have no impact on mercury recovery or, if it did, that technical solutions could easily be developed and implemented.

Testing by PEI Associates, Inc. for the Chlorine Institute demonstrated that these impurities contributed to significant operating problems. This data was previously submitted by the Chlorine Institute in order to meet the December 22, 1989 BDAT data comment deadline. The two major problems were glazing and agglomeration of the waste at temperatures in excess of 900°C, thereby entrapping mercury and resulting in significant pluggage of downstream recovery equipment from particulate carryover. The results of these tests clearly indicate that industry will have to undertake a significant development program to construct a viable thermal recovery unit if thermal recovery is adopted as BDAT. Direct technology transfer from mercury ore mining does not appear to be viable. In addition, the different material characteristics raises the question of whether the low mercury residuals projected (<16 ppm) by USEPA can ever be realized.

Comment Number: 31-B-3
Docket Number: LD12-00129
Commenter: Olin Chemicals
Issue: Mercury Cell Process Waste (K071, K106)
Subissue: Thermal Recovery Standard: Demonstratability
Comment:

Mercury recovery from low level mercury containing wastes using thermal treatment has not been demonstrated as BDAT for K106, K071, and D009 wastes. The only example of thermal "treatment" cited in the Background Document where recovery of mercury occurs is the McDermitt Mine retort. However, in that instance the feedstock was highly concentrated. In addition, no data is available to show how much mercury was lost to other media during the recovery process. No other examples of mercury actually recovered are given. As currently proposed retorting would be required for K071, K106, and D009 non-wastewaters above 16 mg/kg total mercury. However, all of the data used by the USEPA to demonstrate retorting was based on mercury feed concentrations much higher than 16 mg/kg. The data used by the USEPA ranged from 738,000 mg/kg (McDermitt cinnabar ores) to 255 mg/kg (mixed K071/K106) mercury feed concentrations. The Chlorine Institute K106 Retort Study used actual K106 wastes from three different member companies with mercury feed concentrations ranging from 171,000 mg/kg to 2,550 mg/kg. This K106 Retort Study showed that mercury recovery even at these levels is extremely difficult, as no elemental mercury was recovered from any of the runs performed during this study.

COMMENT NUMBER: 31-B-3
DOCKET NUMBER: LD12-00129
COMMENTER: OLIN CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

This commenter, as well as others, believes that thermal recovery has not been adequately demonstrated for high mercury content wastes. (Comments concerning the proposed cutoff limit are addressed in subissue responses 31-G). The commenter's argument is based, to a large extent, on the results of a recent study entitled, "Test Results for Thermal Desorption Treatment of K106 Chlorine Production Waste" that was prepared for The Chlorine Institute by PEI Associates. This study reported significant operational problems and poor elemental mercury recovery when pilot scale retorting experiments of K106 wastes were conducted. The operational problems reported included poor control of temperature in the reaction zone resulting in glazing and agglomeration of the waste and particulate carryover into downstream recovery equipment. Several commenters have attributed the poor results to the high concentration of chloride salts present in K106 that likely interfere with the overall performance.

EPA has carefully reviewed this PEI study and the various comments submitted to EPA concerning the significance of the findings of the report. EPA has determined that the operational and recovery problems experienced can likely be attributed to inadequate furnace design, operational controls, and recovery system design.

Although EPA recognizes that chloride salts can interfere with the performance of the retorter/roaster, EPA also recognizes that their effect can be minimized and controlled through close control of residence time and temperature within the retort unit. Retorting of a mixed waste comprised of 5 percent K106 and 95 percent K071 has been demonstrated in Perry (1974) (see Background Document for full citation). EPA believes that since it is demonstrated that mercury can be removed from this feed material, which has a

COMMENT NUMBER: 31-B-3 (continued)
DOCKET NUMBER: LD12-00129
COMMENTER: OLIN CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

higher concentration of chloride salts (due to the K071 waste) than pure K106, then chloride salts can be prevented from becoming a source of major performance impairment. In addition, Perry (1974) reported that acid pretreating the sludge prior to retorting increased the mercury removal from the waste. The study results indicate that pretreating the waste can improve its amenability to treatment.

The PEI study utilized a rotary kiln furnace for retorting. Perry (1974) also had experimented with a rotary kiln furnace but switched to a multiple hearth furnace because it provided better control over residence time and eliminated short ciruiting problems. Similarly, the McDermitt Mine utilizes a multiple hearth furnace to roast cinnabar (HgS) ores for mercury recovery (USEPA 1989d) and a multiple hearth furnace is used for recovery of mercury from roasting of copper sulfide ores containing 3,700 t0 15,000 mg/kg mercury (Marshal, undated). Also, unlike the PEI pilot plant study, these full-scale plants successfully recover(ed) mercury from their feed materials. All three facilities designed their mercury recovery systems with the mercury condenser(s) between the dust cyclone and the scrubber system not after the scrubber system as was done in the PEI pilot study. PEI provided no details on the design of the actual condenser unit. However, considering the placement of the unit in the recovery system, it is not surprising that no mercury was recovered.

For this final rule, EPA has determined that thermal recovery has been demonstrated for mercury wastes containing mercury at concentrations as low as 260 mg/kg. This revised cutoff standard is based on the lowest mercury concentration in untreated wastes that have been retorted successfully to recover mercury (Perry 1974). In Perry (1974), mercury was recovered from a system that

COMMENT NUMBER: 31-B-3 (continued)
DOCKET NUMBER: LD12-00129
COMMENTER: OLIN CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

used 5 percent K106 and 95 percent K071 as the feed material. Perry (1974) reported mercury removals from the feed material ranging from 98.3 to 99.8 percent. Perry (1974) reported that over 90 percent of the mercury was recovered, and that improvements to the gas scrubbing system would be expected to improve the recovery.

Comment Number: 31-B-4
Docket Number: LD12-00251
Commenter: BF GOODRICH
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: THERMAL RECOVERY STANDARD: DEMONSTRATABILITY
Comment:

I. Problems with Retorting (K-106)

1. Although retorting of K-106 may eventually be feasible, there are serious reservations concerning its applicability to this waste at the present stage of technology development:

> The November, 1989, Background Document states that K-106 should be easier to thermally treat than concentrated cinnabar due to the lower mercury concentration in K-106 (pg. 3-8).
>
> Thus the EPA concludes that processing this waste under similar conditions to that of concentrated cinnabar and corderoite mercury ores in a retorting unit would result in treated material having at least the same mercury residual levels (11-45 ppm) as achieved during the McDermitt mine runs. By this determination, the EPA either ignored the significant differences with the K-106 mercury wastes solids (K-106 contains large concentrations of salt with a melting point of 801°C, and filter aids, including diatomaceous earth, etc.) or assumed that these materials would have no effect on mercury recovery; or, if they did, technical solutions could be developed and implemented.

Comment Number: 31-B-4
Docket Number: LD12-00251
Commenter: BF GOODRICH
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: THERMAL RECOVERY STANDARD: DEMONSTRATABILITY
Comment:

In the industry test conducted for The Chlorine Institute by PEI Associates, Inc., in which B. F. Goodrich participated, the presence of either all or part of these elements did contribute to significant operating problems. Two major problems were ① glazing and ② agglomeration of the waste at temperatures in excess of 900°C., ③ entrapping mercury and causing significant pluggage of downstream recovery equipment from particulate carryover. Treated material in a series of test runs ranged from 5.9 to 17,800 ppm.

The results of these tests clearly indicate that the industry, if thermal treatment is adopted as BDAT, will have to undertake a significant development effort to construct a commercially viable thermal treatment unit, since a direct technology transfer from mercury ore mining does not appear to be viable. In addition, the different material characteristics raise the question of whether the low mercury residuals projected (16 ppm) can, in fact, be realized consistently on a commercial basis.

Any attempt to remove impurities in K-106 prior to thermal treatment (similar to the McDermitt ore concentration process) would generate a derived-from K-106 consisting mostly of the impurities that cause pluggage in the retort system. No means of handling such a waste has been identified.

Comment Number: 31-B-4
Docket Number: LD12-00251
Commenter: BF GOODRICH
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: THERMAL RECOVERY STANDARD: DEMONSTRATABILITY
Comment:

Mercury recovery from waste containing low concentrations of mercury is difficult and thermal treatment has not been demonstrated adequately as a recovery for K-106, K-071, and D-009 wastes.

The only example of thermal "treatment" cited in the Background Document where recovery of mercury occurs is the McDermitt Mine retort; however, the feed stock was highly concentrated. In addition, no data are available to show how much mercury was lost to other media during the recovery process. No other examples of actual mercury recovery are given.

As currently proposed, retorting would be required for K-071, K-106 and D-009 non-wastewaters above 16 mg/kg total mercury. However, all of the data used by the EPA to demonstrate retorting were based on mercury feed concentrations much higher than 16 mg/kg. The data used by the EPA ranged from 738,000 mg/kg (McDermitt cinnabar ores) to 255 mg/kg (mixed K-071 - K-106) mercury feed concentrations.

The Chlorine Institute K-106 Retort Study used actual K-106 wastes from three different member companies with mercury feed concentrations ranging from 171,000 mg/kg to 2,550 mg/kg. This K-106 Retort Study showed that mercury recovery even at these levels is extremely difficult as no elemental mercury was recovered from any of the runs performed during this study.

COMMENT NUMBER: 31-B-4
DOCKET NUMBER: LD12-00251
COMMENTER: B.F. GOOFRICH
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

This commenter, as well as others, believes that thermal recovery has not been adequately demonstrated for high mercury content wastes. (Comments concerning the proposed cutoff limit are addressed in subissue responses 31-G). The commenter's argument is based, to a large extent, on the results of a recent study entitled, "Test Results for Thermal Desorption Treatment of K106 Chlorine Production Waste" that was prepared for The Chlorine Institute by PEI Associates. This study reported significant operational problems and poor elemental mercury recovery when pilot scale retorting experiments of K106 wastes were conducted. The operational problems reported included poor control of temperature in the reaction zone resulting in glazing and agglomeration of the waste and particulate carryover into downstream recovery equipment. Several commenters have attributed the poor results to the high concentration of chloride salts present in K106 that likely interfere with the overall performance.

EPA has carefully reviewed this PEI study and the various comments submitted to EPA concerning the significance of the findings of the report. EPA has determined that the operational and recovery problems experienced can likely be attributed to inadequate furnace design, operational controls, and recovery system design.

Although EPA recognizes that chloride salts can interfere with the performance of the retorter/roaster, EPA also recognizes that their effect can be minimized and controlled through close control of residence time and temperature within the retort unit. Retorting of a mixed waste comprised of 5 percent K106 and 95 percent K071 has been demonstrated in Perry (1974) (see Background Document for full citation). EPA believes that since it is demonstrated that mercury can be removed from this feed material, which has a

COMMENT NUMBER: 31-B-4 (continued)
DOCKET NUMBER: LD12-00251
COMMENTER: B.F. GOODRICH
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

higher concentration of chloride salts (due to the K071 waste) than pure K106, then chloride salts can be prevented from becoming a source of major performance impairment. In addition, Perry (1974) reported that acid pretreating the sludge prior to retorting increased the mercury removal from the waste. The study results indicate that pretreating the waste can improve its amenability to treatment.

The PEI study utilized a rotary kiln furnace for retorting. Perry (1974) also had experimented with a rotary kiln furnace but switched to a multiple hearth furnace because it provided better control over residence time and eliminated short ciruiting problems. Similarly, the McDermitt Mine utilizes a multiple hearth furnace to roast cinnabar (HgS) ores for mercury recovery (USEPA 1989d) and a multiple hearth furnace is used for recovery of mercury from roasting of copper sulfide ores containing 3,700 t0 15,000 mg/kg mercury (Marshal, undated). Also, unlike the PEI pilot plant study, these full-scale plants successfully recover(ed) mercury from their feed materials. All three facilities designed their mercury recovery systems with the mercury condenser(s) between the dust cyclone and the scrubber system not after the scrubber system as was done in the PEI pilot study. PEI provided no details on the design of the actual condenser unit. However, considering the placement of the unit in the recovery system, it is not surprising that no mercury was recovered.

For this final rule, EPA has determined that thermal recovery has been demonstrated for mercury wastes containing mercury at concentrations as low as 260 mg/kg. This revised cutoff standard is based on the lowest mercury concentration in untreated wastes that have been retorted successfully to recover mercury (Perry 1974). In Perry (1974), mercury was recovered from a system that

COMMENT NUMBER:	31-B-4 (continued)
DOCKET NUMBER:	LD12-00251
COMMENTER:	B.F. GOODRICH
ISSUE:	Mercury Cell Process Waste (K071, K106)
SUBISSUE:	Thermal Recovery Standard: Demonstrability
RESPONSE:	

used 5 percent K106 and 95 percent K071 as the feed material. Perry (1974) reported mercury removals from the feed material ranging from 98.3 to 99.8 percent. Perry (1974) reported that over 90 percent of the mercury was recovered, and that improvements to the gas scrubbing system would be expected to improve the recovery.

Comment Number: 31-B-5
Docket Number: LD12-00258
Commenter: AKZO CHEMICALS INC.
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: THERMAL RECOVERY STANDARD: DEMONSTRATABILITY
Comment:

From the participation of the Akzo LeMoyne Chlorine Plant in the Chlorine Institute sponsored Mercury Containing Wastes Task Group (MCWTG) and the resultant K106 Retort Study conducted by PEI Associates, Inc. , as well as discussions held with Chlorine Institute members with previous retorting experience; the following problems associated with retorting mercury containing non-wastewaters classified as K071, K106 and D009 are noted. The "Test Results for Thermal Desorption Treatment of K106 Chlorine Production Waste" by PEI Associates, Inc., has been submitted by the Chlorine Institute during the comment period for the proposed Land Disposal Restrictions for Third Scheduled Wastes.

Mercury recovery from low level mercury concentrated feeds is difficult – As currently proposed retorting would be required for K071, K106 and D009 non-wastewaters above 16 mg/kg total mercury. However, all of the data used by the EPA to demonstrate retorting was based on mercury feed concentrations much higher than 16 mg/kg. The data used by the EPA ranged from 738,000 mg/kg (McDermott cinnubar ores) to 255 mg/kg (mixed K071/K106) mercury feed concentrations.

The Chlorine Institute K106 Retort Study used actual K106 wastes from three different member companies with mercury feed concentrations ranging from 171,000 mg/kg to 2,550 mg/kg. This K106 Retort Study showed that mercury recovery even at these levels is difficult as no elemental mercury was recovered from any of the runs performed during this study.

Transfer of mercury to downstream equipment/media – The K106 Retort Study showed that the mercury level in the retorted feed could be significantly reduced. However, some of the removed mercury was only transferred to downstream pollution control equipment and other media (water, air). The waste streams generated by this downstream transfer will require additional treatment as mercury wastes.

Comment Number: 31-B-5
Docket Number: LD 12-00258
Commenter: AKZO CHEMICALS INC.
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: THERMAL RECOVERY STANDARD: DEMONSTRATABILITY
Comment:

Material Handling Problems – Due to the nature of the wet, mercury solid wastes, material handling problems were experienced throughout the K106 Retort Study. Air drying of the untreated K106 was conducted to attempt to reduce these problems with little success. Material handling problems experienced included difficulty in feeding material to the thermal separator, carryover of particulate matter from the thermal separator to downstream pollution control equipment which caused equipment plugging, and plugging caused by solidification of materials due to high temperatures involved.

Temperature Control Difficulties – As the temperature of the thermal reaction of the K106 was difficult to control, this caused solidification of materials and the resulting entrapment of mercury along with some of the material handling problems mentioned above.

COMMENT NUMBER: 31-B-5

DOCKET NUMBER: LD12-00258

COMMENTER: AKZO CHEMICALS INC.

ISSUE: Mercury Cell Process Waste (K071, K106)

SUBISSUE: Thermal Recovery Standard: Demonstrability

RESPONSE:

This commenter, as well as others, believes that thermal recovery has not been adequately demonstrated for high mercury content wastes. (Comments concerning the proposed cutoff limit are addressed in subissue responses 31-G). The commenter's argument is based, to a large extent, on the results of a recent study entitled, "Test Results for Thermal Desorption Treatment of K106 Chlorine Production Waste" that was prepared for The Chlorine Institute by PEI Associates. This study reported significant operational problems and poor elemental mercury recovery when pilot scale retorting experiments of K106 wastes were conducted. The operational problems reported included poor control of temperature in the reaction zone resulting in glazing and agglomeration of the waste and particulate carryover into downstream recovery equipment. Several commenters have attributed the poor results to the high concentration of chloride salts present in K106 that likely interfere with the overall performance.

EPA has carefully reviewed this PEI study and the various comments submitted to EPA concerning the significance of the findings of the report. EPA has determined that the operational and recovery problems experienced can likely be attributed to inadequate furnace design, operational controls, and recovery system design.

Although EPA recognizes that chloride salts can interfere with the performance of the retorter/roaster, EPA also recognizes that their effect can be minimized and controlled through close control of residence time and temperature within the retort unit. Retorting of a mixed waste comprised of 5 percent K106 and 95 percent K071 has been demonstrated in Perry (1974) (see Background Document for full citation). EPA believes that since it is demonstrated that mercury can be removed from this feed material, which has a

COMMENT NUMBER: 31-B-5 (continued)
DOCKET NUMBER: LD12-00258
COMMENTER: AKZO CHEMICALS INC.
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

higher concentration of chloride salts (due to the K071 waste) than pure K106, then chloride salts can be prevented from becoming a source of major performance impairment. In addition, Perry (1974) reported that acid pretreating the sludge prior to retorting increased the mercury removal from the waste. The study results indicate that pretreating the waste can improve its amenability to treatment.

The PEI study utilized a rotary kiln furnace for retorting. Perry (1974) also had experimented with a rotary kiln furnace but switched to a multiple hearth furnace because it provided better control over residence time and eliminated short ciruiting problems. Similarly, the McDermitt Mine utilizes a multiple hearth furnace to roast cinnabar (HgS) ores for mercury recovery (USEPA 1989d) and a multiple hearth furnace is used for recovery of mercury from roasting of copper sulfide ores containing 3,700 t0 15,000 mg/kg mercury (Marshal, undated). Also, unlike the PEI pilot plant study, these full-scale plants successfully recover(ed) mercury from their feed materials. All three facilities designed their mercury recovery systems with the mercury condenser(s) between the dust cyclone and the scrubber system not after the scrubber system as was done in the PEI pilot study. PEI provided no details on the design of the actual condenser unit. However, considering the placement of the unit in the recovery system, it is not surprising that no mercury was recovered.

For this final rule, EPA has determined that thermal recovery has been demonstrated for mercury wastes containing mercury at concentrations as low as 260 mg/kg. This revised cutoff standard is based on the lowest mercury concentration in untreated wastes that have been retorted successfully to recover mercury (Perry 1974). In Perry (1974), mercury was recovered from a system that

COMMENT NUMBER: 31-B-5 (continued)
DOCKET NUMBER: LD12-00258
COMMENTER: AKZO CHEMICALS INC.
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

used 5 percent K106 and 95 percent K071 as the feed material. Perry (1974) reported mercury removals from the feed material ranging from 98.3 to 99.8 percent. Perry (1974) reported that over 90 percent of the mercury was recovered, and that improvements to the gas scrubbing system would be expected to improve the recovery.

Comment Number: 31-B-6
Docket Number: LD12-00265
Commenter: PIONEER
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: THERMAL RECOVERY STANDARD: DEMONSTRATABILITY
Comment:

Problems with Retorting (K106)

1. Although retorting of K106 may eventually be feasible, there are serious reservations concerning its applicability to this waste at the present stage of technology development:

> The November, 1989 Background Document states that K106 should be easier to thermally treat than concentrated cinnabar due to the lower mercury concentration in K106 (pg. 3-8). Thus the EPA concludes that processing this waste under similar conditions to that of concentrated cinnabar and corderoite mercury ores in a retorting unit would result in treated material having at least the same mercury residual levels (11 - 45 ppm) as achieved during the McDermitt mine runs. By this determination, the EPA ignored the significant differences between cinnabar and the K106 mercury waste solids, such as large concentrations of salt (melting point of 801°C), and filter aids, including diatomaceous earth, etc. EPA assumed that these materials would have no effect on mercury recovery, or if they did, technical solutions could be easily developed and implemented.
>
> In the industry test conducted for The Chlorine Institute by PEI Associates, Inc., the presence of either all or part of these elements (salt concentrations and filters) did create significant operating problems. Two major problems were glazing and agglomeration of the waste at temperatures in excess of 900°C, entrapping mercury, and significant pluggage of downstream recovery equipment from particulate carryover. As a result, treated material in a series of test runs ranged from 5.9 to 17,800 ppm residual mercury levels.
>
> The results of these tests clearly indicate that the industry, if thermal treatment is adopted as BDAT, will have to undertake a significant development effort to construct an operationally viable unit. A direct technology transfer from mercury ore mining does not appear feasible. In addition, the test results raise the question whether the low mercury residuals projected (16 ppm) can in fact be consistently realized.

Any attempt to remove impurities in K106 prior to thermal treatment (similar to the McDermitt ore concentration process) would generate a derived-from K106 waste consisting mostly of the impurities that cause pluggage in the retort system. No means of handling such a waste has been identified.

Comment Number: 31-B-6
Docket Number: LD12-00265
Commenter: PIONEER
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: THERMAL RECOVERY STANDARD: DEMONSTRATABILITY
Comment:

3. Mercury recovery from wastes containing low concentrations of mercury is difficult. Thermal treatment has not been adequately demonstrated as a recovery methodology for K106, K071 and D009 wastes.

> The only example of thermal "treatment" cited in the Background Document where recovery of mercury occurs is the McDermitt Mine retort. However, the feed stock there was highly concentrated. In addition, no data is available to show how much mercury was lost to other media during the recovery process. No other examples of actual mercury recovery are provided by EPA.
>
> As currently proposed, retorting would be required for K071, K106 and D009 non-wastewaters above 16 mg/kg total mercury. However, all of the data used by the EPA to demonstrate retorting was based on mercury feed concentrations much higher than 16 mg/kg. The data used by the EPA ranged from 738,000 Mg/kg (McDermitt cinnabar ores) to 255 mg/kg (mixed K071/-D106 mercury feed concentrations.) No recovery was reported at the 255 mg/kg feed concentration.

The Chlorine Institute K106 Retort Study used actual K106 wastes from three different member companies with mercury feed concentrations ranging from 171,000 mg/kg to 2,550 mg/kg. This K106 Retort Study showed that mercury recovery even at these levels is extremely difficult as no elemental mercury was recovered from any of the runs performed during this study.

COMMENT NUMBER: 31-B-6
DOCKET NUMBER: LD12-00265
COMMENTER: PIONEER
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

This commenter, as well as others, believes that thermal recovery has not been adequately demonstrated for high mercury content wastes. (Comments concerning the proposed cutoff limit are addressed in subissue responses 31-G). The commenter's argument is based, to a large extent, on the results of a recent study entitled, "Test Results for Thermal Desorption Treatment of K106 Chlorine Production Waste" that was prepared for The Chlorine Institute by PEI Associates. This study reported significant operational problems and poor elemental mercury recovery when pilot scale retorting experiments of K106 wastes were conducted. The operational problems reported included poor control of temperature in the reaction zone resulting in glazing and agglomeration of the waste and particulate carryover into downstream recovery equipment. Several commenters have attributed the poor results to the high concentration of chloride salts present in K106 that likely interfere with the overall performance.

EPA has carefully reviewed this PEI study and the various comments submitted to EPA concerning the significance of the findings of the report. EPA has determined that the operational and recovery problems experienced can likely be attributed to inadequate furnace design, operational controls, and recovery system design.

Although EPA recognizes that chloride salts can interfere with the performance of the retorter/roaster, EPA also recognizes that their effect can be minimized and controlled through close control of residence time and temperature within the retort unit. Retorting of a mixed waste comprised of 5 percent K106 and 95 percent K071 has been demonstrated in Perry (1974) (see Background Document for full citation). EPA believes that since it is demonstrated that mercury can be removed from this feed material, which has a

COMMENT NUMBER: 31-B-6 (continued)
DOCKET NUMBER: LD12-00265
COMMENTER: PIONEER
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

higher concentration of chloride salts (due to the K071 waste) than pure K106, then chloride salts can be prevented from becoming a source of major performance impairment. In addition, Perry (1974) reported that acid pretreating the sludge prior to retorting increased the mercury removal from the waste. The study results indicate that pretreating the waste can improve its amenability to treatment.

The PEI study utilized a rotary kiln furnace for retorting. Perry (1974) also had experimented with a rotary kiln furnace but switched to a multiple hearth furnace because it provided better control over residence time and eliminated short ciruiting problems. Similarly, the McDermitt Mine utilizes a multiple hearth furnace to roast cinnabar (HgS) ores for mercury recovery (USEPA 1989d) and a multiple hearth furnace is used for recovery of mercury from roasting of copper sulfide ores containing 3,700 t0 15,000 mg/kg mercury (Marshal, undated). Also, unlike the PEI pilot plant study, these full-scale plants successfully recover(ed) mercury from their feed materials. All three facilities designed their mercury recovery systems with the mercury condenser(s) between the dust cyclone and the scrubber system not after the scrubber system as was done in the PEI pilot study. PEI provided no details on the design of the actual condenser unit. However, considering the placement of the unit in the recovery system, it is not surprising that no mercury was recovered.

For this final rule, EPA has determined that thermal recovery has been demonstrated for mercury wastes containing mercury at concentrations as low as 260 mg/kg. This revised cutoff standard is based on the lowest mercury concentration in untreated wastes that have been retorted successfully to recover mercury (Perry 1974). In Perry (1974), mercury was recovered from a system that

COMMENT NUMBER: 31-B-6 (continued)
DOCKET NUMBER: LD12-00265
COMMENTER: PIONEER
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

used 5 percent K106 and 95 percent K071 as the feed material. Perry (1974) reported mercury removals from the feed material ranging from 98.3 to 99.8 percent. Perry (1974) reported that over 90 percent of the mercury was recovered, and that improvements to the gas scrubbing system would be expected to improve the recovery.

Comment Number: 31-B-7
Docket Number: LD12-00132
Commenter: THE CHLORINE INSTITUTE
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: THERMAL RECOVERY STANDARD: DEMONSTRATABILITY
Comment:

Although retorting of K106 may eventually be feasible, there are serious reservations concerning its applicability to this waste at the present stage of technology development:

> The November, 1989 Background Document states that K106 should be easier to thermally treat than concentrated cinnabar due to the lower mercury concentration in K106 (pg. 3-8). Thus the EPA concludes that processing this waste under similar conditions to that of concentrated cinnabar and corderoite mercury ores in a retorting unit would result in treated material having at least the same mercury residual levels (11 - 45 ppm) as achieved during the McDermitt mine runs. By this determination, the EPA either ignored the significant differences with the K106 mercury wastes solids such as large concentrations of salt (melting point of 801°C) and filter aids, including diatomaceous earth, etc., or assumed that these materials would have no effect on mercury recovery; or if it did, technical solutions could be developed and implemented.
>
> In the industry test conducted for The Chlorine Institute by PEI Associates, Inc., the presence of either all or part of these elements did contribute to significant operating problems. Two major problems were glazing and agglomeration of the waste at temperatures in excess of 900°C, entrapping mercury and significant pluggage of downstream recovery equipment from particulate carryover. As a result, the treated material in a series of test runs ranged from 5.9 to 17,800 ppm residual mercury levels.
>
> The results of these tests clearly indicates that the industry, if thermal treatment is adopted as BDAT, will have to undertake a significant development effort to construct a commercially viable unit. A direct technology transfer from mercury ore mining does not appear viable. In addition, the different material characteristics raise the question whether the low mercury residuals projected (16 ppm) can in fact be consistently realized on a commercial basis.

Any attempt to remove impurities in K106 prior to thermal treatment, (similar to the McDermitt ore concentration process) would generate a derived-from K106 consisting mostly of the impurities that cause pluggage in the retort system. No means of handling such a waste has been identified.

Comment Number: 31-B-7

Docket Number: LD12-00132

Commenter: THE CHLORINE INSTITUTE

Issue: MERCURY CELL PROCESS WASTE (K071, K106)

Subissue: THERMAL RECOVERY STANDARD: DEMONSTRATABILITY

Comment:

Mercury recovery from wastes containing low concentrations of mercury is difficult and thermal treatment has not been adequately demonstrated as a recovery for K106, K071, and D009 wastes.

- The only example of thermal "treatment" cited in the Background Document where recovery of mercury occurs is the McDermitt Mine retort. However, the feed stock was highly concentrated. In addition, no data is available to show how much mercury was lost to other media during the recovery process. No other examples of actual mercury recovery are given.
- As currently proposed retorting would be required for K071, K106 and D009 nonwastewaters above 16 mg/kg total mercury. However, all of the data used by the EPA to demonstrate retorting was based on mercury feed concentrations much higher than 16 mg/kg. The data used by the EPA ranged from 738,000 mg/kg (McDermitt cinnabar ores) to 255 mg/kg (mixed K071/K106) mercury feed concentrations.

The Chlorine Institute K106 Retort Study used actual K106 wastes from three different member companies with mercury feed concentrations ranging from 171,000 mg/kg to 2,550 mg/kg. This K106 Retort Study showed that mercury recovery even at these levels is extremely difficult as no elemental mercury was recovered from any of the runs performed during this study.

COMMENT NUMBER:	31-B-7
DOCKET NUMBER:	LD12-00132
COMMENTER:	THE CHLORINE INSTITUTE
ISSUE:	Mercury Cell Process Waste (K071, K106)
SUBISSUE:	Thermal Recovery Standard: Demonstrability
RESPONSE:	

This commenter, as well as others, believes that thermal recovery has not been adequately demonstrated for high mercury content wastes. (Comments concerning the proposed cutoff limit are addressed in subissue responses 31-G). The commenter's argument is based, to a large extent, on the results of a recent study entitled, "Test Results for Thermal Desorption Treatment of K106 Chlorine Production Waste" that was prepared for The Chlorine Institute by PEI Associates. This study reported significant operational problems and poor elemental mercury recovery when pilot scale retorting experiments of K106 wastes were conducted. The operational problems reported included poor control of temperature in the reaction zone resulting in glazing and agglomeration of the waste and particulate carryover into downstream recovery equipment. Several commenters have attributed the poor results to the high concentration of chloride salts present in K106 that likely interfere with the overall performance.

EPA has carefully reviewed this PEI study and the various comments submitted to EPA concerning the significance of the findings of the report. EPA has determined that the operational and recovery problems experienced can likely be attributed to inadequate furnace design, operational controls, and recovery system design.

Although EPA recognizes that chloride salts can interfere with the performance of the retorter/roaster, EPA also recognizes that their effect can be minimized and controlled through close control of residence time and temperature within the retort unit. Retorting of a mixed waste comprised of 5 percent K106 and 95 percent K071 has been demonstrated in Perry (1974) (see Background Document for full citation). EPA believes that since it is demonstrated that mercury can be removed from this feed material, which has a

COMMENT NUMBER: 31-B-7 (continued)
DOCKET NUMBER: LD12-00132
COMMENTER: THE CHLORINE INSTITUTE
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

higher concentration of chloride salts (due to the K071 waste) than pure K106, then chloride salts can be prevented from becoming a source of major performance impairment. In addition, Perry (1974) reported that acid pretreating the sludge prior to retorting increased the mercury removal from the waste. The study results indicate that pretreating the waste can improve its amenability to treatment.

The PEI study utilized a rotary kiln furnace for retorting. Perry (1974) also had experimented with a rotary kiln furnace but switched to a multiple hearth furnace because it provided better control over residence time and eliminated short ciruiting problems. Similarly, the McDermitt Mine utilizes a multiple hearth furnace to roast cinnabar (HgS) ores for mercury recovery (USEPA 1989d) and a multiple hearth furnace is used for recovery of mercury from roasting of copper sulfide ores containing 3,700 t0 15,000 mg/kg mercury (Marshal, undated). Also, unlike the PEI pilot plant study, these full-scale plants successfully recover(ed) mercury from their feed materials. All three facilities designed their mercury recovery systems with the mercury condenser(s) between the dust cyclone and the scrubber system not after the scrubber system as was done in the PEI pilot study. PEI provided no details on the design of the actual condenser unit. However, considering the placement of the unit in the recovery system, it is not surprising that no mercury was recovered.

For this final rule, EPA has determined that thermal recovery has been demonstrated for mercury wastes containing mercury at concentrations as low as 260 mg/kg. This revised cutoff standard is based on the lowest mercury concentration in untreated wastes that have been retorted successfully to recover mercury (Perry 1974). In Perry (1974), mercury was recovered from a system that

COMMENT NUMBER: 31-B-7 (continued)

DOCKET NUMBER: LD12-00132

COMMENTER: THE CHLORINE INSTITUTE

ISSUE: Mercury Cell Process Waste (K071, K106)

SUBISSUE: Thermal Recovery Standard: Demonstrability

RESPONSE:

used 5 percent K106 and 95 percent K071 as the feed material. Perry (1974) reported mercury removals from the feed material ranging from 98.3 to 99.8 percent. Perry (1974) reported that over 90 percent of the mercury was recovered, and that improvements to the gas scrubbing system would be expected to improve the recovery.

Comment Number: 31-B-8

Docket Number: LD12-00133

Commenter: PPG

Issue: MERCURY CELL PROCESS WASTE (K071, K106)

Subissue: THERMAL RECOVERY STANDARD: DEMONSTRATABILITY

Comment:

Thermal recovery has not been demonstrated as feasible for sulfide precipitated K106. EPA's BDAT evaluation is based upon data from McDermitt Mine, a mercury producer, and is not directly translatable to K106 and other wastes without further development. Because of the significant differences in mercury mine ores and mercury cell waste, such as salt, and filter aid materials like diatomaceous earth, direct technology transfer from retorting mercury mine ores to chlor-alkali waste such as K106 is not technically sound. Accordingly, it is believed that the development effort for a commercially viable recovery unit will be extensive. The ability to achieve low levels of residual mercury in the treated K106 waste has not been demonstrated and actual concentrations may be significantly higher than projected by the proposed regulations which are based upon the McDermitt Mine test data.

PPG believes that EPA has not fully considered the practical aspects or environmental impact of setting the threshold level for thermal recovery at 16 mg/kg. First as a residual level, this concentration has not been demonstrated by either technology transfer or by commercial demonstration. Second, setting a treatment threshold at the expected residual level amounts to treatment for treatment's sake with no positive environmental gain. In other words, this represents an extremely wasteful use of resources, not to mention the environmental degradation caused by the burning of energy resources to fuel the recovery unit. Further, low concentrations of relatively non-leachable mercury present less of a risk to human health and the environment when land disposed than might be posed by mercury air emissions from even a well operated recovery unit. Even assuming that all mercury could somehow be magically removed from waste containing the threshold level, only 16 pounds of mercury would be available for recovery from 1,000,000 pounds of waste. Considering the inevitable losses to atmosphere and scrubber waters in the retorting machinery, it is doubtful that this minuscule quantity of mercury would ever be found as a recovered product.

Comment Number: 31-B-8
Docket Number: LD12-00133
Commenter: PPG
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: THERMAL RECOVERY STANDARD: DEMONSTRATABILITY
Comment:

The majority of K106 waste generated in this country results from sulfide precipitation. Yet EPA has no data demonstrating that retorting can effectively treat this material. EPA bases its identification of retorting as BDAT on data derived from the retorting of mercury ores. EPA indicates in its background document that the percentage of mercury in unconcentrated ores is comparable to the percentage in K106 nonwastewater. (Background Document at p. 55). However, EPA indicates that the ores are concentrated to approximately 65% mercury prior to retorting. EPA does not discuss whether such concentrating operations are feasible for waste sludges.

Further, PPG questions whether the ore matrix is comparable to the sludge matrix for purposes of liberating the mercury. PPG suspects that liberating mercury from the sludge is likely to be much more difficult, and believes the percentage of mercury recovered is likely to be significantly lower than from the ore. This calls into question the ability to achieve a BDAT level of 630 mg/kg by retorting K106. There is no data in the record which indicates EPA's selected BDAT levels can be achieved by retorting K106. In fact, EPA's selected BDAT level is based upon a single data point from the retorting of mercury ore. For these reasons PPG believes the administrative record described in the Background Document and the preamble to the proposed rule does not support a conclusion that retorting is a "demonstrated" technology for treatment of K106.

Further, there is no evidence to support EPA's conclusion that retorting is "available" treatment for K106. EPA cannot point to a single facility that is commercially treating K106 by retorting. PPG is aware of only one operation in the United States that is retorting mercury ore. Further, for the reasons described more fully below, PPG believes it is highly unlikely that additional capacity will become available prior to the expiration of EPA's proposed two year variance for K106 waste.

For the foregoing reasons, PPG believes EPA has not justified that retorting is either a demonstrated or an available technology for treating K106 waste.

COMMENT NUMBER: 31-B-8
DOCKET NUMBER: LD12-00133
COMMENTER: PPG
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

This commenter, as well as others, believes that thermal recovery has not been adequately demonstrated for high mercury content wastes. (Comments concerning the proposed cutoff limit are addressed in subissue responses 31-G). The commenter's argument is based, to a large extent, on the results of a recent study entitled, "Test Results for Thermal Desorption Treatment of K106 Chlorine Production Waste" that was prepared for The Chlorine Institute by PEI Associates. This study reported significant operational problems and poor elemental mercury recovery when pilot scale retorting experiments of K106 wastes were conducted. The operational problems reported included poor control of temperature in the reaction zone resulting in glazing and agglomeration of the waste and particulate carryover into downstream recovery equipment. Several commenters have attributed the poor results to the high concentration of chloride salts present in K106 that likely interfere with the overall performance.

EPA has carefully reviewed this PEI study and the various comments submitted to EPA concerning the significance of the findings of the report. EPA has determined that the operational and recovery problems experienced can likely be attributed to inadequate furnace design, operational controls, and recovery system design.

Although EPA recognizes that chloride salts can interfere with the performance of the retorter/roaster, EPA also recognizes that their effect can be minimized and controlled through close control of residence time and temperature within the retort unit. Retorting of a mixed waste comprised of 5 percent K106 and 95 percent K071 has been demonstrated in Perry (1974) (see Background Document for full citation). EPA believes that since it is demonstrated that mercury can be removed from this feed material, which has a

COMMENT NUMBER: 31-B-8 (continued)
DOCKET NUMBER: LD12-00133
COMMENTER: PPG
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

higher concentration of chloride salts (due to the K071 waste) than pure K106, then chloride salts can be prevented from becoming a source of major performance impairment. In addition, Perry (1974) reported that acid pretreating the sludge prior to retorting increased the mercury removal from the waste. The study results indicate that pretreating the waste can improve its amenability to treatment.

The PEI study utilized a rotary kiln furnace for retorting. Perry (1974) also had experimented with a rotary kiln furnace but switched to a multiple hearth furnace because it provided better control over residence time and eliminated short ciruiting problems. Similarly, the McDermitt Mine utilizes a multiple hearth furnace to roast cinnabar (HgS) ores for mercury recovery (USEPA 1989d) and a multiple hearth furnace is used for recovery of mercury from roasting of copper sulfide ores containing 3,700 t0 15,000 mg/kg mercury (Marshal, undated). Also, unlike the PEI pilot plant study, these full-scale plants successfully recover(ed) mercury from their feed materials. All three facilities designed their mercury recovery systems with the mercury condenser(s) between the dust cyclone and the scrubber system not after the scrubber system as was done in the PEI pilot study. PEI provided no details on the design of the actual condenser unit. However, considering the placement of the unit in the recovery system, it is not surprising that no mercury was recovered.

For this final rule, EPA has determined that thermal recovery has been demonstrated for mercury wastes containing mercury at concentrations as low as 260 mg/kg. This revised cutoff standard is based on the lowest mercury concentration in untreated wastes that have been retorted successfully to recover mercury (Perry 1974). In Perry (1974), mercury was recovered from a system that

COMMENT NUMBER: 31-B-8 (continued)
DOCKET NUMBER: LD12-00133
COMMENTER: PPG
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Thermal Recovery Standard: Demonstrability
RESPONSE:

used 5 percent K106 and 95 percent K071 as the feed material. Perry (1974) reported mercury removals from the feed material ranging from 98.3 to 99.8 percent. Perry (1974) reported that over 90 percent of the mercury was recovered, and that improvements to the gas scrubbing system would be expected to improve the recovery.

Comment Number: 31-C-1
Docket Number: L012-00129
Commenter: Olin Chemicals
Issue: Mercury Cell Process Waste
Subissue: Treatment Standard for K071 and K106 Wastewater
Comment:

The proposed regulation for mercury (D009, K071, K106, and U151) wastewaters specifies a BDAT concentration of 0.030 mg/l mercury to qualify for land disposal as a hazardous waste. Olin takes exception to this proposal. These wastewaters are typically effluents from NPDES/POTW treatment facilities and are stored in surface impoundments prior to discharge. In multi-plant operations, these ponds are used as either emergency basins (to handle upsets in the treatment units) or for accumulation prior to discharge. Further, NPDES or POTW discharge limits are multi-variable and the ponds are used to "smooth-out" any variations in any of the discharge parameters. Olin believes that treated wastewaters below 0.200 mg/l should not be considered a hazardous waste, and hence use of discharge impoundments would continue to be regulated under NPDES/POTW wastewater permits. The Agency established the 0.030 mg/l mercury standard based on the assumption that the fully oxidized wastewater from K071 washing is the most complex to treat. Actually, the fully oxidized wastewater from K071 treatment is the easiest to treat by sulfide addition. Much more complex streams come from multi-product facilities - specifically the sodium hydrosulfite process. These streams contain soluble, non-ionic forms of mercury which cannot be treated to <30 ppb by simple sulfide addition. Olin submitted data on this to the Agency during the comment period of the first third regulations.

COMMENT NUMBER:	31-C-1
DOCKET NUMBER:	LD12-00129
COMMENTER:	OLIN CHEMICALS
ISSUE:	Mercury Cell Process Waste (K071, K106)
SUBISSUE:	Treatment Standard for K071 and K106 Wastewater

This commenter objected to the proposed standard of 0.030 mg/l for K106 and U151 wastewaters for two reasons: (1) "These wastewaters are typically effluents from NPDES/POTW treatment facilities stored prior to discharge for emergency upset purposes, or "accumulation prior to discharge" to "smooth out" variations in discharge parameters; (2) there are more complex streams than K071 (on whose treatment the 0.030 standard is based), hence more difficult to treat.

With respect to the commenter's first belief, EPA believes that "upsets" resulting in mercury concentrations higher than the established treatment standard should not be allowed in surface impoundments. One of the reasons that land disposal standards are being developed is because of such "upset" management. With respect to "smoothing out" variations, EPA understands the need to equalize flow and concentration gradients in treatment systems. However, properly operated equalization implies that the equalization unit (be it an impoundment or a tank) is a well-mixed system in which the constituent concentration in the equalization unit is the same as the concentration in the discharge from the equalization unit. Hence, if the concentration within the unit exceeds a treatment standard, so will its discharge. The equalization unit will not treat (i.e., remove) mercury in its inlet feed stream, only "smooth out" the mercury concentration. If the average concentration to the unit exceeds a treatment standard, so will the unit's discharge. EPA believes that discharge standards should be met, regardless of whether

COMMENT NUMBER: 31-C-1 (Continued)
DOCKET NUMBER: LD12-00129
COMMENTER: OLIN CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Treatment Standard for K071 and K106 Wastewater

equalization is employed. Therefore, the concentration within the equalization unit should meet discharge standards.

With respect to the issue of wastewater streams more complex than K071, EPA acknowledges that there may be certain wastewaters that may require combinations of waste treatment technologies in addition to or in lieu of sulfide precipitation/filtration. The use of other wastewater treatment technologies are not precluded by the promulgated performance standard of 0.030 mg/l for K106 and U151 wastewaters. However, the commenter submitted no specific data and thus failed to demonstrate that combinations of other wastewater treatment tecnologies are unable to meet the standard.

Comment Number: 31- D-1
Docket Number: LD12-00128
Commenter: VULCAN CHEMICALS
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: MULTIMEDIA IMPACTS
Comment:

A major short coming of the thermal treatment of K106 wastes is the fugitive emissions of mercury vapor into the environment, which itself presents serious questions as to the technical feasibility of the process for this type of waste.

COMMENT NUMBER: 31-D-1
DOCKET NUMBER: LD12-00128
COMMENTER: VULCAN CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

The commenter has expressed concern regarding the potential for increased fugitive emissions of mercury vapor into the environment from thermal recovery operations.

Fugitive emissions from handling Hg wastes prior to retorting would be controlled in two ways. First, these facilities would need to obtain RCRA storage permits and meet RCRA storage standards. These standards control fugitive emissions to some extent, and omnibus permit authority can be used (RCRA section 3005(c)(3)) to address other potential fugitive emission problems. Second, it appears that fugitive emissions would be taken into account in determining if a retorting unit (a type of secondary metal production plant) would be a "major stationary source" for purposes of PSD permitting under the CAA (see 40 CFR §52.21(c)(iii)(s)), and could be controlled by any PSD permits that are issued.

Comment Number: 31-D-2
Docket Number: LD12-00129
Commenter: OLIN CHEMICALS
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: MULTIMEDIA IMPACTS
Comment:

The release of mercury to all media has not yet been adequately addressed for the thermal treatment process. NESHAP impacts have not been addressed for retorting facilities built within an operating chlor-alkali plant facility. Mercury released to ambient air during thermal treatment has not been quantified. Fugitive emissions, which potentially could release large quantities of mercury vapor to the atmosphere, have not been considered in the Background Document. These concerns are substantiated by the fact that the building at the McDermitt mine which houses the thermal recovery unit is a "mercury respirator area" for all employees and visitors. Obviously, some unquantified amount of mercury is being released to the air as fugitive emissions during this operation. USEPA did not attempt to perform a mercury balance in their onsite test report. A mercury based material balance has not yet been achieved around a thermal recovery unit. Without such a balance, the ultimate fate of mercury from the original K106 material is unknown. Until this question is answered, the health and environmental benefits of thermal treatment are, at best, uncertain.

COMMENT NUMBER: 31-D-2
DOCKET NUMBER: LD12-00129
COMMENTER: OLIN CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

The commenter, as well as other commenters, has expressed concern about potential increased emissions of mercury and sulfur dioxide to air as a result of thermal processing. EPA acknowledges the legitimacy of the commenter's concern.

In the proposed administrative record, the Agency provided estimates of the potential amounts of sulfur dioxide that could released from the retorting/roasting of mercury sulfide wastes based on available performance data from a facility thermally processing cinnabar ores. In addition, EPA included in the record an EPA report entitled, "Review of National Emissions Standards (NESHAPS) for Mercury" (EPA 450/3-84-014, 1984). This report provides a summary of air emissions compliance data for all mercury cell chlor-alkali plants and data for several industrial operations including secondary recovery of mercury using retorting. All facilities were well within the allowable emission standards for mercury. The available air emission information indicates that both mercury and sulfur dioxide emissions can be effectively controlled by well designed and operated air pollution control equipment.

To control the potential problem of mercury air emissions from retorting devices, however, the Agency is specifying as part of the designated section 3004 (m) method that the retorting unit must either be (1) subject to the mercury NESHAP; (2) subject to a PSD

COMMENT NUMBER: 31-D-2 (Continued)
DOCKET NUMBER: LD12-00129
COMMENTER: OLIN CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

permit pursuant to Section 165 of the Clean Air Act; or (3) subject to any type of state air permit providing an emission limitation (within the meaning of section 302 of the Clean Air Act) for mercury. (The Agency believes that its authority to designate methods of treatment under RCRA Section 3004 (m) includes the authority to establish reasonable operating conditions for the designated methods. In this case, air emission controls for mercury to prevent adverse cross-media impacts are a reasonable operating condition to adopt as part of the retorting method.)

Based on the public comments, it appears that the retorting units would all become subject to either the existing NESHAP (if constructed at a chloralkali plant or a mercury ore processing facility), or to the PSD permitting requirements, or both. This is because the retorters appear to be secondary metals production plants which are classified as "major stationary sources" if they emit more than 100 tons per year of a regulated air pollutant. If this is the case, the substantive PSD requirements would apply to the plants' mercury emissions, because they have the potential to emit more than 0.1 ton per year of mercury, the amount that would trigger PSD permitting. See 40 CFR § 52.21 (1) (i)(a), (b)(iii)(s), and (23) (i) plus PPG's comment (LD12-00133) that potential mercury emissions from retorting devices would be 1 ton per year. EPA believes that the BACT or LAER controls imposed pursuant to the PSD permit would adequately address the potential problem of cross-media impacts.

COMMENT NUMBER: 31-D-2 (Continued)
DOCKET NUMBER: LD12-00129
COMMENTER: OLIN CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

The commenters' questions about which NESHAP standard could potentially apply is an implementation issue which EPA will address after the close of the rulemaking.

Comment Number: 31-D-3
Docket Number: LD12-00251
Commenter: BF GOODRICH
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: MULTIMEDIA IMPACTS
Comment:

The release of mercury to all media has not yet been adequately addressed for the thermal treatment process. NESHAP impacts have not been addressed adequately for retorting facilities built within an operating chlor-alkali plant facility.

Mercury released to ambient air during thermal treatment has not been quantified adequately. Fugitive emissions, which would release additional quantities of mercury vapor to the atmosphere, have not been considered in the Background Document.

A mercury based material balance has not yet been achieved around a thermal recovery unit. Attempts to close such a balance around the PEI test unit were unsuccessful. Without such a balance, the ultimate fate of mercury from the original K-106 material is unknown. Until this question is answered, the health and environmental benefits of thermal treatment are, at best, uncertain.

COMMENT NUMBER: 31-D-3
OCKET NUMBER: LD12-00251
COMMENTER: B.F. GOODRICH
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

The commenter, as well as other commenters, has expressed concern about potential increased emissions of mercury and sulfur dioxide to air as a result of thermal processing. EPA acknowledges the legitimacy of the commenter's concern.

In the proposed administrative record, the Agency provided estimates of the potential amounts of sulfur dioxide that could released from the retorting/roasting of mercury sulfide wastes based on available performance data from a facility thermally processing cinnabar ores. In addition, EPA included in the record an EPA report entitled, "Review of National Emissions Standards (NESHAPS) for Mercury" (EPA 450/3-84-014, 1984). This report provides a summary of air emissions compliance data for all mercury cell chlor-alkali plants and data for several industrial operations including secondary recovery of mercury using retorting. All facilities were well within the allowable emission standards for mercury. The available air emission information indicates that both mercury and sulfur dioxide emissions can be effectively controlled by well designed and operated air pollution control equipment.

To control the potential problem of mercury air emissions from retorting devices, however, the Agency is specifying as part of the designated section 3004 (m) method that the retorting unit must either be (1) subject to the mercury NESHAP; (2) subject to a PSD permit pursuant to Section 165 of the Clean Air Act; or (3) subject

COMMENT NUMBER: 31-D-3 (Continued)
DOCKET NUMBER: LD12-00251
COMMENTER: B.F. GOODRICH
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

to any type of state air permit providing an emission limitation (within the meaning of section 302 of the Clean Air Act) for mercury. (The Agency believes that its authority to designate methods of treatment under RCRA Section 3004 (m) includes the authority to establish reasonable operating conditions for the designated methods. In this case, air emission controls for mercury to prevent adverse cross-media impacts are a reasonable operating condition to adopt as part of the retorting method.)

Based on the public comments, it appears that the retorting units would all become subject to either the existing NESHAP (if constructed at a chloralkali plant or a mercury ore processing facility), or to the PSD permitting requirements, or both. This is because the retorters appear to be secondary metals production plants which are classified as "major stationary sources" if they emit more than 100 tons per year of a regulated air pollutant. If this is the case, the substantive PSD requirements would apply to the plants' mercury emissions, because they have the potential to emit more than 0.1 ton per year of mercury, the amount that would trigger PSD permitting. See 40 CFR § 52.21 (1) (i)(a), (b)(iii)(s), and (23) (i) plus PPG's comment (LD12-00133) that potential mercury emissions from retorting devices would be 1 ton per year. EPA believes that the BACT or LAER controls imposed pursuant to the PSD permit would adequately address the potential problem of cross-media impacts.

COMMENT NUMBER: 31-D-3 (Continued)
DOCKET NUMBER: LD12-00251
COMMENTER: B.F. GOODRICH
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

The commenters' questions about which NESHAP standard could potentially apply is an implementation issue which EPA will address after the close of the rulemaking.

Comment Number: 31-D-4
Docket Number: LD12-00258
Commenter: AKZO CHEMICALS INC.
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: MULTIMEDIA IMPACTS
Comment:

NESHAP and NPDES Implications – Air and water mercury emissions will be increased as retorting of mercury wastes is conducted. Existing and future NESHAP and NPDES mercury limits will be increasingly difficult to meet.

COMMENT NUMBER: 31-D-4
DOCKET NUMBER: LD12-00258
COMMENTER: AKZO CHEMICALS INC.
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

The commenter, as well as other commenters, has expressed concern about potential increased emissions of mercury and sulfur dioxide to air as a result of thermal processing. EPA acknowledges the legitimacy of the commenter's concern.

In the proposed administrative record, the Agency provided estimates of the potential amounts of sulfur dioxide that could released from the retorting/roasting of mercury sulfide wastes based on available performance data from a facility thermally processing cinnabar ores. In addition, EPA included in the record an EPA report entitled, "Review of National Emissions Standards (NESHAPS) for Mercury" (EPA 450/3-84-014, 1984). This report provides a summary of air emissions compliance data for all mercury cell chlor-alkali plants and data for several industrial operations including secondary recovery of mercury using retorting. All facilities were well within the allowable emission standards for mercury. The available air emission information indicates that both mercury and sulfur dioxide emissions can be effectively controlled by well designed and operated air pollution control equipment.

To control the potential problem of mercury air emissions from retorting devices, however, the Agency is specifying as part of the designated section 3004 (m) method that the retorting unit must either be (1) subject to the mercury NESHAP; (2) subject to a PSD permit pursuant to Section 165 of the Clean Air Act; or (3) subject

COMMENT NUMBER: 31-D-4 (Continued)
DOCKET NUMBER: LD12-00258
COMMENTER: AKZO CHEMICALS INC.
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

to any type of state air permit providing an emission limitation (within the meaning of section 302 of the Clean Air Act) for mercury. (The Agency believes that its authority to designate methods of treatment under RCRA Section 3004 (m) includes the authority to establish reasonable operating conditions for the designated methods. In this case, air emission controls for mercury to prevent adverse cross-media impacts are a reasonable operating condition to adopt as part of the retorting method.)

Based on the public comments, it appears that the retorting units would all become subject to either the existing NESHAP (if constructed at a chloralkali plant or a mercury ore processing facility), or to the PSD permitting requirements, or both. This is because the retorters appear to be secondary metals production plants which are classified as "major stationary sources" if they emit more than 100 tons per year of a regulated air pollutant. If this is the case, the substantive PSD requirements would apply to the plants' mercury emissions, because they have the potential to emit more than 0.1 ton per year of mercury, the amount that would trigger PSD permitting. See 40 CFR § 52.21 (1) (i)(a), (b)(iii)(s), and (23) (i) plus PPG's comment (LD12-00133) that potential mercury emissions from retorting devices would be 1 ton per year. EPA believes that the BACT or LAER controls imposed pursuant to the PSD permit would adequately address the potential problem of cross-media impacts.

COMMENT NUMBER: 31-D-4 (Continued)
DOCKET NUMBER: LD12-00258
COMMENTER: AKZO CHEMICALS INC.
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

The commenters' questions about which NESHAP standard could potentially apply is an implementation issue which EPA will address after the close of the rulemaking.

Comment Number: 31-D-5
Docket Number: LD12-00265
Commenter: PIONEER
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: MULTIMEDIA IMPACTS
Comment:

2. The release of mercury to all media has not yet been adequately addressed for the thermal treatment process. NESHAP impacts have not been adequately addressed for retorting facilities built within an operating chlor-alkali plant facility. Examples of these considerations are as follows:

> Mercury released to ambient air during thermal treatment has not been adequately quantified. Fugitive emissions would release additional quantities of mercury vapor to the atmosphere which have not been considered in the Background Document.
>
> A mercury based material balance has not yet been achieved around a thermal treatment unit. Attempts to close such a balance around the PEI test unit were unsuccessful. Without a balance, the ultimate fate of mercury from the original K106 material is unknown. Until this question is answered, the health and environmental benefits of thermal treatment are, at best, uncertain.

COMMENT NUMBER: 31-D-5
DOCKET NUMBER: LD12-00265
COMMENTER: PIONEER
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

The commenter, as well as other commenters, has expressed concern about potential increased emissions of mercury and sulfur dioxide to air as a result of thermal processing. EPA acknowledges the legitimacy of the commenter's concern.

In the proposed administrative record, the Agency provided estimates of the potential amounts of sulfur dioxide that could released from the retorting/roasting of mercury sulfide wastes based on available performance data from a facility thermally processing cinnabar ores. In addition, EPA included in the record an EPA report entitled, "Review of National Emissions Standards (NESHAPS) for Mercury" (EPA 450/3-84-014, 1984). This report provides a summary of air emissions compliance data for all mercury cell chlor-alkali plants and data for several industrial operations including secondary recovery of mercury using retorting. All facilities were well within the allowable emission standards for mercury. The available air emission information indicates that both mercury and sulfur dioxide emissions can be effectively controlled by well designed and operated air pollution control equipment.

To control the potential problem of mercury air emissions from retorting devices, however, the Agency is specifying as part of the designated section 3004 (m) method that the retorting unit must either be (1) subject to the mercury NESHAP; (2) subject to a PSD permit pursuant to Section 165 of the Clean Air Act; or (3) subject

COMMENT NUMBER: 31-D-5 (Continued)
DOCKET NUMBER: LD12-00265
COMMENTER: PIONEER
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

to any type of state air permit providing an emission limitation (within the meaning of section 302 of the Clean Air Act) for mercury. (The Agency believes that its authority to designate methods of treatment under RCRA Section 3004 (m) includes the authority to establish reasonable operating conditions for the designated methods. In this case, air emission controls for mercury to prevent adverse cross-media impacts are a reasonable operating condition to adopt as part of the retorting method.)

Based on the public comments, it appears that the retorting units would all become subject to either the existing NESHAP (if constructed at a chloralkali plant or a mercury ore processing facility), or to the PSD permitting requirements, or both. This is because the retorters appear to be secondary metals production plants which are classified as "major stationary sources" if they emit more than 100 tons per year of a regulated air pollutant. If this is the case, the substantive PSD requirements would apply to the plants' mercury emissions, because they have the potential to emit more than 0.1 ton per year of mercury, the amount that would trigger PSD permitting. See 40 CFR § 52.21 (1) (i)(a), (b)(iii)(s), and (23) (i) plus PPG's comment (LD12-00133) that potential mercury emissions from retorting devices would be 1 ton per year. EPA believes that the BACT or LAER controls imposed pursuant to the PSD permit would adequately address the potential problem of cross-media impacts.

COMMENT NUMBER: 31-D-5 (Continued)
DOCKET NUMBER: LD12-00265
COMMENTER: PIONEER
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

The commenters' questions about which NESHAP standard could potentially apply is an implementation issue which EPA will address after the close of the rulemaking.

Comment Number: 31- D-6

Docket Number: LD12-00132

Commenter: THE CHLORINE INSTITUTE

Issue: MERCURY CELL PROCESS WASTE (K071, K106)

Subissue: MULTIMEDIA IMPACTS

Comment:

The release of mercury to all media has not yet been adequately addressed for the thermal treatment process. NESHAP impacts have not been adequately addressed for retorting facilities built within an operating chlor-alkali plant facility.

- Mercury released to ambient air during thermal treatment has not been adequately quantified. Fugitive emissions would release additional quantities of mercury vapor to the atmosphere which have not been considered in the Background Document.
- A mercury based material balance has not yet been achieved around a thermal treatment unit. Attempts to close such a balance around the PEI test unit were unsuccessful. Without such a balance, the ultimate fate of mercury from the original K106 material is unknown. Until this question is answered, the health and environmental benefits of thermal treatment are, at best, uncertain.

COMMENT NUMBER: 31-D-6
DOCKET NUMBER: LD12-00132
COMMENTER: THE CHLORINE INSTITUTE
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

The commenter, as well as other commenters, has expressed concern about potential increased emissions of mercury and sulfur dioxide to air as a result of thermal processing. EPA acknowledges the legitimacy of the commenter's concern.

In the proposed administrative record, the Agency provided estimates of the potential amounts of sulfur dioxide that could released from the retorting/roasting of mercury sulfide wastes based on available performance data from a facility thermally processing cinnabar ores. In addition, EPA included in the record an EPA report entitled, "Review of National Emissions Standards (NESHAPS) for Mercury" (EPA 450/3-84-014, 1984). This report provides a summary of air emissions compliance data for all mercury cell chlor-alkali plants and data for several industrial operations including secondary recovery of mercury using retorting. All facilities were well within the allowable emission standards for mercury. The available air emission information indicates that both mercury and sulfur dioxide emissions can be effectively controlled by well designed and operated air pollution control equipment.

To control the potential problem of mercury air emissions from retorting devices, however, the Agency is specifying as part of the designated section 3004 (m) method that the retorting unit must either be (1) subject to the mercury NESHAP; (2) subject to a PSD permit pursuant to Section 165 of the Clean Air Act; or (3) subject

COMMENT NUMBER: 31-D-6 (Continued)
DOCKET NUMBER: LD12-00132
COMMENTER: THE CHLORINE INSTITUTE
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

to any type of state air permit providing an emission limitation (within the meaning of section 302 of the Clean Air Act) for mercury. (The Agency believes that its authority to designate methods of treatment under RCRA Section 3004 (m) includes the authority to establish reasonable operating conditions for the designated methods. In this case, air emission controls for mercury to prevent adverse cross-media impacts are a reasonable operating condition to adopt as part of the retorting method.)

Based on the public comments, it appears that the retorting units would all become subject to either the existing NESHAP (if constructed at a chloralkali plant or a mercury ore processing facility), or to the PSD permitting requirements, or both. This is because the retorters appear to be secondary metals production plants which are classified as "major stationary sources" if they emit more than 100 tons per year of a regulated air pollutant. If this is the case, the substantive PSD requirements would apply to the plants' mercury emissions, because they have the potential to emit more than 0.1 ton per year of mercury, the amount that would trigger PSD permitting. See 40 CFR § 52.21 (1) (i)(a), (b)(iii)(s), and (23) (i) plus PPG's comment (LD12-00133) that potential mercury emissions from retorting devices would be 1 ton per year. EPA believes that the BACT or LAER controls imposed pursuant to the PSD permit would adequately address the potential problem of cross-media impacts.

COMMENT NUMBER: 31-D-6 (Continued)
DOCKET NUMBER: LD12-00132
COMMENTER: THE CHLORINE INSTITUTE
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

The commenters' questions about which NESHAP standard could potentially apply is an implementation issue which EPA will address after the close of the rulemaking.

Comment Number: 31-D-7
Docket Number: LD12-00133
Commenter: PPG
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: MULTIMEDIA IMPACTS
Comment:

In the preamble to the proposal, EPA recognizes that some of the selected treatment technologies are likely to result in the cross-media transfer of hazardous constituents to air. 53 Fed. Reg. at 17616. This would no doubt be the case for mercury if retorting is chosen as BDAT for K106.

PPG believes that a treatment standard is defective under §3004(m) if it fails to "substantially reduce the likelihood of migration of hazardous constituents from the waste so that short-term and long-term threats to human health and the environment are minimized." Yet, EPA has failed to evaluate the impact of this cross-media transfer of mercury on human health and the environment. EPA presents no data in its proposal or Background Document to support the conclusion that retorting is likely to reduce the overall release of mercury to the environment from K106. To the contrary, PPG suspects that retorting K106 waste could result in an increase in the amount of mercury released for the following reasons.

First of all, mercury is very difficult to contain in a vapor form. Despite the use of air pollution control equipment, there will no doubt be an increase in mercury vapors in the area surrounding any retort constructed for the treatment of K106. While the retort facility would be subject to the NESHAP standards for mercury, it is unclear whether such a facility would be subject to the 2300 or 3200 grams/day limit if it exclusively processes K106 sludges. (See, 40 CFR §61.52). In either case, there is likely to be an increase of approximately one ton/year of mercury emissions to the atmosphere for each retort constructed to process K106 waste. It is unclear from the data described by EPA how many retorts would be needed to handle the total volume of K106 generated. However, PPG suspects that the required number will be greater than a simple function of retort production capacity, because of the technological limitations associated with the design of an air pollution control system able to meet the NESHAP standards.

Further, the existing NESHAP standard makes it virtually impossible for generators to consider the construction of retorts at their production facilities. Chlorine producers which use mercury chlor-alkali cells are currently subject to the 2300 grams/day limitation for mercury. PPG believes it is highly unlikely that this standard could be met at chlorine production facilities based on current technology if a retort were added.

Second, EPA presents no data on the leaching characteristics of the retort residue. It is true that retorting should reduce the overall concentration of mercury in the K106 sludge, though as stated earlier, PPG believes EPA's estimates are overly optimistic. Nevertheless, the remaining mercury will likely have been converted from relatively non-leachable mercury sulfide to more leachable mercury compounds. This could mean a greater amount of mercury will be released to the environment through the groundwater route by virtue of this conversion to more leachable forms. In any event, PPG believes EPA's lack of any actual data on leachate from retorted K106 residue means that its BDAT leachate standard for nonwastewater is wholly unsupported by the record in this rulemaking.

COMMENT NUMBER: 31-D-7
DOCKET NUMBER: LD12-00133
COMMENTER: PPG
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

The commenter, as well as other commenters, has expressed concern about potential increased emissions of mercury and sulfur dioxide to air as a result of thermal processing. EPA acknowledges the legitimacy of the commenter's concern.

In the proposed administrative record, the Agency provided estimates of the potential amounts of sulfur dioxide that could released from the retorting/roasting of mercury sulfide wastes based on available performance data from a facility thermally processing cinnabar ores. In addition, EPA included in the record an EPA report entitled, "Review of National Emissions Standards (NESHAPS) for Mercury" (EPA 450/3-84-014, 1984). This report provides a summary of air emissions compliance data for all mercury cell chlor-alkali plants and data for several industrial operations including secondary recovery of mercury using retorting. All facilities were well within the allowable emission standards for mercury. The available air emission information indicates that both mercury and sulfur dioxide emissions can be effectively controlled by well designed and operated air pollution control equipment.

To control the potential problem of mercury air emissions from retorting devices, however, the Agency is specifying as part of the designated section 3004 (m) method that the retorting unit must either be (1) subject to the mercury NESHAP; (2) subject to a PSD permit pursuant to Section 165 of the Clean Air Act; or (3) subject

COMMENT NUMBER: 31-D-7 (Continued)
DOCKET NUMBER: LD12-00133
COMMENTER: PPG
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

to any type of state air permit providing an emission limitation (within the meaning of section 302 of the Clean Air Act) for mercury. (The Agency believes that its authority to designate methods of treatment under RCRA Section 3004 (m) includes the authority to establish reasonable operating conditions for the designated methods. In this case, air emission controls for mercury to prevent adverse cross-media impacts are a reasonable operating condition to adopt as part of the retorting method.)

Based on the public comments, it appears that the retorting units would all become subject to either the existing NESHAP (if constructed at a chloralkali plant or a mercury ore processing facility), or to the PSD permitting requirements, or both. This is because the retorters appear to be secondary metals production plants which are classified as "major stationary sources" if they emit more than 100 tons per year of a regulated air pollutant. If this is the case, the substantive PSD requirements would apply to the plants' mercury emissions, because they have the potential to emit more than 0.1 ton per year of mercury, the amount that would trigger PSD permitting. See 40 CFR § 52.21 (1) (i)(a), (b)(iii)(s), and (23) (i) plus PPG's comment (LD12-00133) that potential mercury emissions from retorting devices would be 1 ton per year. EPA believes that the BACT or LAER controls imposed pursuant to the PSD permit would adequately address the potential problem of cross-media impacts.

COMMENT NUMBER: 31-D-7 (Continued)
DOCKET NUMBER: LD12-00133
COMMENTER: PPG
ISSUE: Mercury Cell Process Waste (K071, K106)
ISSUE: Multimedia Impacts
RESPONSE:

The commenters' questions about which NESHAP standard could potentially apply is an implementation issue which EPA will address after the close of the rulemaking.

Comment Number: 31-E-1
Docket Number: L012-00073
Commenter: Chemfix
Issue: Mercury Cell Process Waste
Subissue: Stabilization as BDAT Option
Comment:

MERCURY

The agency discusses the problems of alkaline disposal conditions for mercury sulfide wastes and for mercury residues in an alkaline environment in general. The following comments are directed at the potential for the CHEMSET™/ CHEMFIX® Process to render mercury sulfide as well as mercuric oxide wastes to within the proposed 30 ppBillion TCLP standard.

The attached Database for all of the "D" metals indicates that the straight CHEMFIX® Process as applied directly to mercuric wastes, is not as successful in reducing mercury leachability to very low levels, as it is with other heavy metals and analytes of concern. However, through a CHEMSET™ proprietary pretreatment followed by the basic CHEMFIX® Process, mercury wastes can be rendered stable under the alkaline conditions of the CHEMFIX® end product matrix. And, the final product will meet the TCLP standards of 30 ppBillion or below. The full range of the capabilities of this CHEMSET™/CHEMFIX® mercury fixation process are not known. But, it is clear that the option of stabilization/fixation (S/F) treatment should not be foreclosed as a viable BDAT treatment. S/F should be allowed if any given generator can show that their particular waste can be rendered to within the TCLP standards established.

Comment Number: 31-E-1
Docket Number: L012-00073
Commenter: Chemfix
Issue: Mercury Cell Process Waste
Subissue: Stabilization as BDAT Option
Comment:

"CALIFORNIA LIST" METALS DATABASE SUMMARY

CONSTITUENTS OF CONCERN	NUMBER OF SAMPLES	TOTAL CONC. (AVERAGE) mg/kg	STATUTORY LEVELS + mg/l	HEALTH BASED STANDARDS mg/l (HBS)	LEACHATE CONCENTRATIONS IN EP EXTRACTS OF CHEMFIX PRODUCT / COMPARED TO HEALTH BASED STANDARD (HBS)		
					LESS THAN 1X HBS*	LESS THAN 10X HBS	LESS THAN 100X HBS**
ARSENIC	229	<0.01 - 2000 (Avg.= 34.47)	500	0.05	101 (44%)	217 (95%)	227 (99%)
CADMIUM	243	0.01 - 98000 (Avg.= 643.9)	100	0.01	13 (5%)	208 (86%)	232 (95%)
* CHROMIUM	253	0.03 - 709970 (Avg.= 4035.1)	500	0.05	62 (25%)	231 (91%)	247 (98%)
LEAD	258	0.1 - 96200 (Avg.= 1879.6)	500	0.05	6 (2%)	213 (83%)	253 (98%)
MERCURY	188	0.005 - 37200 (Avg.= 43.70)	20	0.002	34 (18%)	105 (56%)	183 (97%)
NICKEL	234	0.05 - 37320 (Avg.= 588.4)	134	0.34	169 (72%)	229 (98%)	234 (100%)
SELENIUM	201	<0.01 - 80.0 (Avg.= 6.89)	100	0.01	40 (20%)	143 (71%)	199 (99%)
THALLIUM	N.A.	N.A.	130	0.01	N.A.	N.A.	N.A.

N.A. : Sample not anlayzed for constituent.

+ : Statutory levels are based on the "California Metal Lists" published on the HSWA 1984.

* : 1 time health based standard equivalent to drinking water standard.

** : 100 times health based standard equivalent to EP toxicity standard.

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Comment Number: 31-E-1
Docket Number: LD12-00073
Commenter: Chemfix
Issue: Mercury Cell Process Waste
Subissue: Stabilization as BDAT Option
Comment:

CHEMFIX

Business Development **Technology Services**

TECHNICAL DEVELOPMENT REPORT

Recent work with the Group IIB metal Mercury (Hg) has shown that the CHEMFIX® Process, through the use of CHEMSET® reaction promoter agent(s), can be made to yield extraction results far better than are typical of the CHEMFIX® Process alone. A brief indication of is given below as to the very low leachable levels that have been achieved.

A. Mercury Brine Mud

Mercury, Total	164,000 parts per billion
Mercury, Raw TCLP Leach Data	15 parts per billion

EP TOX LEACH DATA/CHEMFIX PRODUCT:

Treatment scheme 1 w/ CHEMSET®	0.7 parts per billion
Treatment scheme 2 w/CHEMSET®	0.5 parts per billion
Treatment scheme 3 wo/CHEMSET®	21.5 parts per billion
Treatment scheme 4 wo/CHEMSET®	20.2 parts per billion

B. Mining Tailings Waste

Mercury, Raw EP Leach	94 parts per billion

EP TOX LEACH DATA/CHEMFIX PRODUCT:

Treatment scheme 1 w/CHEMSET®	0.79 parts per billion
Treatment scheme 2 w/CHEMSET®	0.70 parts per billion

COMMENT NUMBER: 31-E-1
DOCKET NUMBER: LD12-00073
COMMENTER: CHEMFIX
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Stabilization as BDAT Option
RESPONSE:

This commenter believes that stabilization should be allowed as a BDAT option. The commenter provided information (summary information only) on the results of commercial proprietary stabilization of D009 wastes and one K071 waste (mercury brine mud). The commentor stated that their treatment method had been used on 188 D009 waste samples ranging in untreated total mercury content from 0.005 to 37,200 mg/kg (average of 43.7 mg/kg). Because individual sample data, QA/QC data, and untreated waste extraction data were not provided for the D009 wastes, it was not possible to assess the performance of the data submitted (see Response to Comment No. 10-D-2 for more details). The commenter also provided TCLP analysis results on a K071 nonwastewater both before treatment (total mercury = 164 mg/kg; TCLP = 0.015 mg/l) and after four proprietary stabilization treatments (TCLP = 0.0007 mg/l, 0.0005 mg/l, 0.0215 mg/l, and 0.0202 mg/l). These data were not used to calculate standards because no QA/QC data nor design and operating condition data were provided. In addition, this waste as generated meets the BDAT standard for K071 wastewater and is not precluded from land disposal. However, if a standard had been calculated using the four data points corresponding to the four proprietary treatments, the standards would have been 0.002 mg/l, 0.001 mg/l, 0.060 mg/l, or 0.057 mg/l. The Agency has requested supplemental data from the commenter concerning these test data. However, at the time of this rulemaking, no response to the request has been received.

COMMENT NUMBER: 31-E-1 (Continued)
DOCKET NUMBER: LD12-00073
COMMENTER: CHEMFIX
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Stabilization as BDAT Option
RESPONSE:

EPA has evaluated the various comments submitted relating to the stabilization issue and has determined that treatment standards for those mercury wastes amenable to recovery (i.e., high-mercury subcategory wastes) should be based on recovery technologies. EPA has determined that thermal recovery is a demonstrated technology for high-mercury subcategory wastes as explained in the Background Document and in the response to comments for subissue 10-B. There is a strong preference in the land disposal restrictions for treatment standards to be based on recovery where possible (e.g., S. Rep. No. 284 at 17). This preference is reinforced by the overall goals of RCRA to encourage waste minimization and resource recovery (e.g., RCRA section 1003(a) (6)).

In the proposed rule (54 FR 48440), EPA requested comments on whether it should establish requirements under 40 CFR Parts 264 and 265 for mercury sulfide wastes and for mercury residues in general. The proposed requirements were the result of a concern that leaching of mercury from these wastes may increase if the wastes were placed under alkaline conditions.

This commenter, as well as other commenters addressed this issue. The majority believe that, although regulations requiring segregation of wastes or use of monofills could be implemented, specific regulations are not needed at this time for several reasons: a) operators of landfills must now monitor leachate collection systems for the migration of metals; b) operators of

COMMENT NUMBER: 31-E-1 (Continued)
DOCKET NUMBER: LD12-00073
COMMENTER: CHEMFIX
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Stabilization as BDAT Option
RESPONSE:

landfills already segregate these wastes as part of the waste analysis plan; c) such requirements should be made on a site- and waste-specific basis by the permit writers at the state and federal level; and d) some vendors of specialized stabilization materials have submitted information that show some promise in stabilizing these materials under alkaline conditions.

At this time , EPA is withdrawing its proposed requirements under 40 CFR Parts 264 and 265. The Agency feels that additional data are needed before a determination can be made to issue such a national prohibition standard. Still, EPA believes that permit writers can determine the need for requiring additional prohibitions upon disposal of these wastes on a case-by-case basis according to the provisions under 40 CFR Parts 264 and 265.

Comment Number: 31-E-2
Docket Number: LD12-00138
Commenter: OXYCHEM
Issue: Mercury Cell Process Waste
Subissue: Stabilization as BDAT Option
Comment:

Mercury sulfide is a stable, relatively immobile compound under most conditions, including typical groundwater pH. Thermal treatment to decompose this compound into more mobile compounds and transferring mercury from the solid waste to air, waster and solid waste (as demonstrated in The Chlorine Institute's December 21, 1989 submission) is questionable environmental protection. The following treatment is recommended: stabilization to a level of 0.2 mg/l mercury as measured by the TCLP (or alkaline) leachate procedure.

COMMENT NUMBER: 31-E-2
DOCKET NUMBER: LD12-00138
COMMENTER: OXYCHEM
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Stabilization as BDAT Option
RESPONSE:

This commenter, as well as other commenters, believes that the proposed thermal recovery standard is not needed for mercury-containing wastes in the proposed high-mercury subcategory that are generated as mercury sulfides. The commenters emphasize that because these wastes contain mercury in the form of mercury sulfide, a relatively insoluble and immobile form of mercury under most conditions, disposal of these wastes is environmentally sound and thus, EPA should deem these wastes to meet BDAT, as generated. Another issue raised by the commenter is that thermal recovery may result in increased emissions of mercury to air and also may result in recovery residuals that contain a more leachable form of mercury than the untreated waste.

EPA has evaluated the various comments carefully but has determined that treatment standards for those mercury wastes amenable to recovery (i.e., high-mercury subcategory wastes) should be based on recovery technologies. EPA has determined that thermal recovery is a demonstrated technology for high-mercury subcategory wastes (i.e., contain 260 mg/kg or greater mercury) as explained in the Background Document and in the response to comments for subissue 10-B. There is a strong preference in the land disposal restrictions for treatment standards to be based on recovery where possible (e.g., S. Rep. No. 284 at 17). This preference is reinforced by the overall goals of RCRA to encourage waste minimization and resource recovery (e.g., RCRA section 1003(a) (6)). For wastes in the low-mercury subcategory (i.e., contain less than 260 mg/kg of mercury), BDAT has been promulgated as
0.2 mg/l as measured by TCLP).

The Agency further concludes that compliance with the mercury NESHAP, PSD BACT/LAER controls, or installation of the control technologies on which the

COMMENT NUMBER: 31-E-2 (continued)
DOCKET NUMBER: LD12-00138
COMMENTER: OXYCHEM
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Stabilization as BDAT Option
RESPONSE:

standards are based, will ensure that point source air emissions of mercury are contolled so as to be protective of human health and the environment.

EPA has also considered the argument that wastes from retorting will contain a more leachable form of mercury than at least the mercury sulfide wastes being retorted. Although this will be true in some cases, leachable mercury in retorting wastes will still be at low levels, and well below the characteristic level. More important, there will be less mercury to leach over time because most mercury will be recovered as product. Thus, overall potential of disposed mercury to be released to the environment will be significantly reduced. Retorting/roasting also achieves volumetric waste reduction compared to stabilization because it reduces the overall volume of waste to be disposed, unlike stabilization which increases it.

Comment Number: 31 - E-3

Docket Number: L012-00128

Commenter: Vulcan Chemicals

Issue: Mercury Cell Process Waste

Subissue: STABILIZATION AS BDAT OPTION

Comment:

Nonetheless, Vulcan still has serious reservations regarding EPA's proposed thermal treatment or retorting and believes that sulfide precipitation should be considered as BDAT technology for the land disposal of mercury waste materials. As noted in the proposed rule, the acid leaching and sulfide precipitation was promulgated as BDAT for K071 and the solubility of mercury sulfide still remains one of the lowest of the metal salts and the natural mineral, cinnabar, is not considered to present any particular hazard. Although, the co-disposal of mercury sulfide with alkaline materials could increase the potential for solubilization of the insoluble mercury salt, an appropriate solution to this problem would be to require the segregation of such materials to reduce or eliminate the potential for the creation of an alkaline mercury leachate.

COMMENT NUMBER: 31-E-3
DOCKET NUMBER: LD12-00128
COMMENTR: VULCAN CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Stabilization as BDAT Option
RESPONSE:

This commenter, as well as other commenters, believes that the proposed thermal recovery standard is not needed for mercury-containing wastes in the proposed high-mercury subcategory that are generated as mercury sulfides. The commenters emphasize that because these wastes contain mercury in the form of mercury sulfide, a relatively insoluble and and immobile form of mercury under most conditions, disposal of these wastes is environmentally sound and thus, EPA should deem these wastes to meet BDAT, as generated.

EPA has evaluated the various comments carefully but has determined that treatment standards for those mercury wastes amenable to recovery (i.e., high-mercury subcategory wastes) should be based on recovery technologies. EPA has determined that thermal recovery is a demonstrated technology for high-mercury subcategory wastes (i.e., contain 260 mg/kg or greater mercury) as explained in the Background Document and in the response to comments for subissue 10-B. There is a strong preference in the land disposal restrictions for treatment standards to be based on recovery where possible (e.g., S. Rep. No. 284 at 17). This preference is reinforced by the overall goals of RCRA to encourage waste minimization and resource recovery (e.g., RCRA section 1003(a) (6)). For wastes in the low-mercury subcategory (i.e., contain less than 260 mg/kg of mercury), BDAT has been promulgated as
0.2 mg/l as measured by TCLP).

In the proposed rule (54 FR 48440), EPA requested comments on whether it should establish requirements under 40 CFR Parts 264 and 265 for mercury sulfide

COMMENT NUMBER: 31-E-3 (continued)

DOCKET NUMBER: LD12-00128

COMMENTR: VULCAN CHEMICALS

ISSUE: Mercury Cell Process Waste (K071, K106)

SUBISSUE: Stabilization as BDAT Option

RESPONSE:

wastes and for mercury residues in general. The proposed requirements were the result of a concern that leaching of mercury from these wastes may increase if the wastes were placed under alkaline conditions.

This commenter, as well as other commenters addressed this issue. The majority believe that, although regulations requiring segregation of wastes or use of monofills could be implemented, specific regulations are not needed at this time for several reasons: a) operators of landfills must now monitor leachate collection systems for the migration of metals; b) operators of landfills already segregate these wastes as part of the waste analysis plan; c) such requirements should be made on a site- and waste-specific basis by the permit writers at the state and federal level; and d) some vendors of specialized stabilization materials have submitted information that show some promise in stabilizing these materials under alkaline conditions.

At this time , EPA is withdrawing its proposed requirements under 40 CFR Parts 264 and 265. The Agency feels that additional data are needed before a determination can be made to issue such a national prohibition standard. Still, EPA believes that permit writers can determine the need for requiring additional prohibitions upon disposal of these wastes on a case-by-case basis according to the provisions under 40 CFR Parts 264 and 265.

Comment Number: 31-E-4
Docket Number: LD12-00129
Commenter: Olin Chemicals
Issue: Mercury Cell Process Waste
Subissue: STABILATION AS BDAT OPTION
Comment:

Given the present state of thermal treatment technology, HgS precipitation and landfilling is a superior BDAT for K106. All the mercury in K106 as HgS is accounted for. The fate of mercury in thermal treatment is unknown. HgS does not emit mercury to the air. Thermal treatment has a high potential for mercury air emissions. HgS is demonstrated as applicable to K106. Thermal treatment has not yet been demonstrated as applicable to K106. The reliability of HgS as a stable form of mercury is documented by extensive analytical data. Data on thermal recovery is limited and insufficient to form a statistically reliable model. The Agency has not addressed nor has it taken into account the impact of any other off-gases that will be evaluated during thermal treatment.

COMMENT NUMBER: 31-E-4
DOCKET NUMBER: LD12-00129
COMMENTER: OLIN CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Stabilization as BDAT Option
RESPONSE:

This commenter, as well as other commenters, believes that the proposed thermal recovery standard is not needed for mercury-containing wastes in the proposed high-mercury subcategory that are generated as mercury sulfides. The commenters emphasize that because these wastes contain mercury in the form of mercury sulfide, a relatively insoluble and immobile form of mercury under most conditions, disposal of these wastes is environmentally sound and thus, EPA should deem these wastes to meet BDAT, as generated. Another issue raised by the commenter is that thermal recovery may result in increased emissions of mercury to air and also may result in recovery residuals that contain a more leachable form of mercury than the untreated waste.

EPA has evaluated the various comments carefully but has determined that treatment standards for those mercury wastes amenable to recovery (i.e., high-mercury subcategory wastes) should be based on recovery technologies. EPA has determined that thermal recovery is a demonstrated technology for high-mercury subcategory wastes (i.e., contain 260 mg/kg or greater mercury) as explained in the Background Document and in the response to comments for subissue 10-B. There is a strong preference in the land disposal restrictions for treatment standards to be based on recovery where possible (e.g., S. Rep. No. 284 at 17). This preference is reinforced by the overall goals of RCRA to encourage waste minimization and resource recovery (e.g., RCRA section 1003(a) (6)). For wastes in the low-mercury subcategory (i.e., contain less than 260 mg/kg of mercury), BDAT has been promulgated as
0.2 mg/l as measured by TCLP).

COMMENT NUMBER:	31-E-4 (continued)
DOCKET NUMBER:	LD12-00129
COMMENTER:	OLIN CHEMICALS
ISSUE:	Mercury Cell Process Waste (K071, K106)
SUBISSUE:	Stabilization as BDAT Option
RESPONSE:	

The Agency further concludes that compliance with the mercury NESHAP, PSD BACT/LAER controls, or installation of the control technologies on which the standards are based, will ensure that point source air emissions of mercury are contolled so as to be protective of human health and the environment.

EPA has also considered the argument that wastes from retorting will contain a more leachable form of mercury than at least the mercury sulfide wastes being retorted. Although this will be true in some cases, leachable mercury in retorting wastes will still be at low levels, and well below the characteristic level. More important, there will be less mercury to leach over time because most mercury will be recovered as product. Thus, overall potential of disposed mercury to be released to the environment will be significantly reduced. Retorting/roasting also achieves volumetric waste reduction compared to stabilization because it reduces the overall volume of waste to be disposed, unlike stabilization which increases it.

Comment Number: 31 – E-5

Docket Number: 2012-00132

Commenter: The Chlorine Institute

Issue: Mercury Cell Process Waste

Subissue: STABILATION AS BDAT OPTION

Comment:

Given the present state of K106 thermal treatment technology, K106 as mercury sulfide (HgS) is environmentally sound.

- Although neither HgS nor retorting are demonstrated recovery technologies, the mercury in K106 as HgS is accounted for. The fate of mercury ~~in~~ thermal treatment is unknown, at present.
- HgS does not emit mercury to the air. Thermal treatment has a high potential for mercury air emissions.
- HgS is demonstrated as applicable to K106. Thermal treatment has not yet been demonstrated as applicable to K106.
- The reliability of HgS as a stable form of mercury is documented by extensive analytical data. Data on thermal recovery is limited and insufficient to form a statistically reliable model.

COMMENT NUMBER: 31-E-5
DOCKET NUMBER: LD12-00132
COMMENTER: THE CHLORINE INSTITUTE
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Stabilization as BDAT Option
RESPONSE:

This commenter, as well as other commenters, believes that the proposed thermal recovery standard is not needed for mercury-containing wastes in the proposed high-mercury subcategory that are generated as mercury sulfides. The commenters emphasize that because these wastes contain mercury in the form of mercury sulfide, a relatively insoluble and immobile form of mercury under most conditions, disposal of these wastes is environmentally sound and thus, EPA should deem these wastes to meet BDAT, as generated. Another issue raised by the commenter is that thermal recovery may result in increased emissions of mercury to air and also may result in recovery residuals that contain a more leachable form of mercury than the untreated waste.

EPA has evaluated the various comments carefully but has determined that treatment standards for those mercury wastes amenable to recovery (i.e., high-mercury subcategory wastes) should be based on recovery technologies. EPA has determined that thermal recovery is a demonstrated technology for high-mercury subcategory wastes (i.e., contain 260 mg/kg or greater mercury) as explained in the Background Document and in the response to comments for subissue 10-B. There is a strong preference in the land disposal restrictions for treatment standards to be based on recovery where possible (e.g., S. Rep. No. 284 at 17). This preference is reinforced by the overall goals of RCRA to encourage waste minimization and resource recovery (e.g., RCRA section 1003(a) (6)). For wastes in the low-mercury subcategory (i.e., contain less than 260 mg/kg of mercury), BDAT has been promulgated as 0.2 mg/l as measured by TCLP).

COMMENT NUMBER: 31-E-5 (continued)
DOCKET NUMBER: LD12-00132
COMMENTER: THE CHLORINE INSTITUTE
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Stabilization as BDAT Option
RESPONSE:

The Agency further concludes that compliance with the mercury NESHAP, PSD BACT/LAER controls, or installation of the control technologies on which the standards are based, will ensure that point source air emissions of mercury are contolled so as to be protective of human health and the environment.

EPA has also considered the argument that wastes from retorting will contain a more leachable form of mercury than at least the mercury sulfide wastes being retorted. Although this will be true in some cases, leachable mercury in retorting wastes will still be at low levels, and well below the characteristic level. More important, there will be less mercury to leach over time because most mercury will be recovered as product. Thus, overall potential of disposed mercury to be released to the environment will be significantly reduced. Retorting/roasting also achieves volumetric waste reduction compared to stabilization because it reduces the overall volume of waste to be disposed, unlike stabilization which increases it.

Comment Number: 31-E-6
Docket Number: LD12-00133
Commenter: PPG
Issue: Mercury Cell Process Waste
Subissue: STABILIZATION AS BDAT OPTION
Comment:

PPG operates two (2) facilities that generate K106. At both facilities plant process wastewaters are treated by sulfide precipitation resulting in a sludge containing mercury sulfide. Mercury sulfide is virtually insoluble and extremely resistant to leaching. This fact is clearly evident from the data in Appendix C of EPA's BDAT Background Document for K106. These data show that sulfide treated K106 waste containing 25,900 mg/l mercury resulted in a leachate containing .01 mg/l mercury.

In fact, it is because of the effectiveness of the sulfide precipitation in fixing mercury in the sludge that EPA concluded that stabilization is an ineffective treatment technology:

> EPA recognizes, however, that the ineffectiveness [of stabilization] may be a result of the fact that the mercury is present in a form that has low leachability.

Sulfide precipitated K106 and D009 should be defined as BDAT as generated. Based upon EPA's concerns that leachability would be increased by mixing with alkaline wastes, the BDAT standard should prescribe that disposal of these wastes be in a monofill environment.

COMMENT NUMBER: 31-E-6
DOCKET NUMBER: LD12-00133
COMMENTER: PPG
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Stabilization as BDAT Option
RESPONSE:

This commenter, as well as other commenters, believes that the proposed thermal recovery standard is not needed for mercury-containing wastes in the proposed high-mercury subcategory that are generated as mercury sulfides. The commenters emphasize that because these wastes contain mercury in the form of mercury sulfide, a relatively insoluble and and immobile form of mercury under most conditions, disposal of these wastes is environmentally sound and thus, EPA should deem these wastes to meet BDAT, as generated.

EPA has evaluated the various comments carefully but has determined that treatment standards for those mercury wastes amenable to recovery (i.e., high-mercury subcategory wastes) should be based on recovery technologies. EPA has determined that thermal recovery is a demonstrated technology for high-mercury subcategory wastes (i.e., contain 260 mg/kg or greater mercury) as explained in the Background Document and in the response to comments for subissue 10-B. There is a strong preference in the land disposal restrictions for treatment standards to be based on recovery where possible (e.g., S. Rep. No. 284 at 17). This preference is reinforced by the overall goals of RCRA to encourage waste minimization and resource recovery (e.g., RCRA section 1003(a) (6)). For wastes in the low-mercury subcategory (i.e., contain less than 260 mg/kg of mercury), BDAT has been promulgated as 0.2 mg/l as measured by TCLP).

In the proposed rule (54 FR 48440), EPA requested comments on whether it should establish requirements under 40 CFR Parts 264 and 265 for mercury sulfide wastes and for mercury residues in general. The proposed requirements were the result of a concern that leaching of mercury from these wastes may increase if the wastes were placed under alkaline conditions.

COMMENT NUMBER: 31-E-6 (continued)

DOCKET NUMBER: LD12-00133

COMMENTER: PPG

ISSUE: Mercury Cell Process Waste (K071, K106)

SUBISSUE: Stabilization as BDAT Option

RESPONSE:

This commenter, as well as other commenters addressed this issue. The majority believe that, although regulations requiring segregation of wastes or use of monofills could be implemented, specific regulations are not needed at this time for several reasons: a) operators of landfills must now monitor leachate collection systems for the migration of metals; b) operators of landfills already segregate these wastes as part of the waste analysis plan; c) such requirements should be made on a site- and waste-specific basis by the permit writers at the state and federal level; and d) some vendors of specialized stabilization materials have submitted information that show some promise in stabilizing these materials under alkaline conditions.

At this time , EPA is withdrawing its proposed requirements under 40 CFR Parts 264 and 265. The Agency feels that additional data are needed before a determination can be made to issue such a national prohibition standard. Still, EPA believes that permit writers can determine the need for requiring additional prohibitions upon disposal of these wastes on a case-by-case basis according to the provisions under 40 CFR Parts 264 and 265.

Comment Number: 31-E-7

Docket Number: LD12-00265

Commenter: PIONEER

Issue: MERCURY CELL PROCESS WASTE (K071, K106)

Subissue: STABILIZATION AS BDAT OPTION

Comment:

Given the present state of K106 thermal treatment technology, K106 in the form of mercury sulfide (HgS) is environmentally sound.

Although neither HgS nor retorting are demonstrated recovery technologies, the mercury in K106 as HgS is accounted for. The fate of mercury in thermal treatment is unknown at present.

HgS does not emit mercury to the air. Thermal treatment has a high potential for mercury air emissions.

HgS is demonstrated as applicable to K106. Thermal treatment has not yet been demonstrated as applicable to K106.

The reliability of HgS as a stable form of mercury is documented by extensive analytical data. Data on thermal recovery is limited and insufficient to form a statistically reliable model.

COMMENT NUMBER: 31-E-7
DOCKET NUMBER: LD12-00265
COMMENTER: PIONEER
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Stabilization as BDAT Option
RESPONSE:

This commenter, as well as other commenters, believes that the proposed thermal recovery standard is not needed for mercury-containing wastes in the proposed high-mercury subcategory that are generated as mercury sulfides. The commenters emphasize that because these wastes contain mercury in the form of mercury sulfide, a relatively insoluble and immobile form of mercury under most conditions, disposal of these wastes is environmentally sound and thus, EPA should deem these wastes to meet BDAT, as generated. Another issue raised by the commenter is that thermal recovery may result in increased emissions of mercury to air and also may result in recovery residuals that contain a more leachable form of mercury than the untreated waste.

EPA has evaluated the various comments carefully but has determined that treatment standards for those mercury wastes amenable to recovery (i.e., high-mercury subcategory wastes) should be based on recovery technologies. EPA has determined that thermal recovery is a demonstrated technology for high-mercury subcategory wastes (i.e., contain 260 mg/kg or greater mercury) as explained in the Background Document and in the response to comments for subissue 10-B. There is a strong preference in the land disposal restrictions for treatment standards to be based on recovery where possible (e.g., S. Rep. No. 284 at 17). This preference is reinforced by the overall goals of RCRA to encourage waste minimization and resource recovery (e.g., RCRA section 1003(a) (6)). For wastes in the low-mercury subcategory (i.e., contain less than 260 mg/kg of mercury), BDAT has been promulgated as 0.2 mg/l as measured by TCLP).

COMMENT NUMBER: 31-E-7 (continued)
DOCKET NUMBER: LD12-00265
COMMENTER: PIONEER
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Stabilization as BDAT Option
RESPONSE:

The Agency further concludes that compliance with the mercury NESHAP, PSD BACT/LAER controls, or installation of the control technologies on which the standards are based, will ensure that point source air emissions of mercury are contolled so as to be protective of human health and the environment.

EPA has also considered the argument that wastes from retorting will contain a more leachable form of mercury than at least the mercury sulfide wastes being retorted. Although this will be true in some cases, leachable mercury in retorting wastes will still be at low levels, and well below the characteristic level. More important, there will be less mercury to leach over time because most mercury will be recovered as product. Thus, overall potential of disposed mercury to be released to the environment will be significantly reduced. Retorting/roasting also achieves volumetric waste reduction compared to stabilization because it reduces the overall volume of waste to be disposed, unlike stabilization which increases it.

Comment Number: 31-E-8
Docket Number: LD12-00251
Commenter: BF Goodrich
Issue: Mercury Cell Process Waste
Subissue: STABILIZATION AS BDAT OPTION
Comment:

5. Given the present state of K-106 thermal treatment technology, K-106 as mercury sulfide (HgS) is the most environmentally sound approach for handling this waste.

   * HgS and retorting are not demonstrated recovery technologies; however, K-106 as HgS accounts for the mercury contained in the waste. The fate of mercury in thermal treatment is unknown, at present.

   HgS does not emit mercury to the air. Thermal treatment has a high potential for mercury air emissions.

HgS is demonstrated as applicable to K-106. Thermal treatment has not yet been demonstrated as applicable to K-106.

The reliability of HgS as a stable form of mercury is documented by extensive analytical data. Data on thermal recovery are limited and insufficient to form a statistically reliable model.

COMMENT NUMBER: 31-E-8
DOCKET NUMBER: LD12-00251
COMMENTER: B.F. GOODRICH
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Stabilization as BDAT Option
RESPONSE:

This commenter, as well as other commenters, believes that the proposed thermal recovery standard is not needed for mercury-containing wastes in the proposed high-mercury subcategory that are generated as mercury sulfides. The commenters emphasize that because these wastes contain mercury in the form of mercury sulfide, a relatively insoluble and immobile form of mercury under most conditions, disposal of these wastes is environmentally sound and thus, EPA should deem these wastes to meet BDAT, as generated. Another issue raised by the commenter is that thermal recovery may result in increased emissions of mercury to air and also may result in recovery residuals that contain a more leachable form of mercury than the untreated waste.

EPA has evaluated the various comments carefully but has determined that treatment standards for those mercury wastes amenable to recovery (i.e., high-mercury subcategory wastes) should be based on recovery technologies. EPA has determined that thermal recovery is a demonstrated technology for high-mercury subcategory wastes (i.e., contain 260 mg/kg or greater mercury) as explained in the Background Document and in the response to comments for subissue 10-B. There is a strong preference in the land disposal restrictions for treatment standards to be based on recovery where possible (e.g., S. Rep. No. 284 at 17). This preference is reinforced by the overall goals of RCRA to encourage waste minimization and resource recovery (e.g., RCRA section 1003(a) (6)). For wastes in the low-mercury subcategory (i.e., contain less than 260 mg/kg of mercury), BDAT has been promulgated as 0.2 mg/l as measured by TCLP).

COMMENT NUMBER: 31-E-8 (continued)
DOCKET NUMBER: LD12-00251
COMMENTER: B.F. GOODRICH
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Stabilization as BDAT Option
RESPONSE:

The Agency further concludes that compliance with the mercury NESHAP, PSD BACT/LAER controls, or installation of the control technologies on which the standards are based, will ensure that point source air emissions of mercury are contolled so as to be protective of human health and the environment.

EPA has also considered the argument that wastes from retorting will contain a more leachable form of mercury than at least the mercury sulfide wastes being retorted. Although this will be true in some cases, leachable mercury in retorting wastes will still be at low levels, and well below the characteristic level. More important, there will be less mercury to leach over time because most mercury will be recovered as product. Thus, overall potential of disposed mercury to be released to the environment will be significantly reduced. Retorting/roasting also achieves volumetric waste reduction compared to stabilization because it reduces the overall volume of waste to be disposed, unlike stabilization which increases it.

Comment Number: 31-E-9
Docket Number: LD12-L0034
Commenter: Hazardous Waste Treatment Council
Issue: Mercury Cell Process Waste
Subissue: STABILIZATION AS BDAT OPTION
Comment:

The HWTC supports these comments and urges EPA to set BDAT on the basis of stabilization. Comments were provided to the LD12 docket by the HWTC providing one data set of a member company on mercury stabilization (Docket No. 00050 and 00067). This data supports that stabilization below the characteristic level is achievable for mercury, and the treatment standard based on this data would be set at 0.052 ppm (see table below).

MERCURY STABILIZATION DATA SUBMITTED BY HWTC

Data Point		TCLP (mg/l)	ln
1		0.04	-3.2189
2		0.167	-1.7898
3		0.03	-3.5066
4		0.04	-3.2189
5		0.0744	-2.5983
6		0.0546	-2.9077
7		0.04	-3.2188
	Mean	0.0375	
	VF	1.39	
	BDAT Standard	0.052	

Comment Number: 31-E-9
Docket Number: LD12-L0034
Commenter: Hazardous Waste Treatment Council
Issue: Mercury Cell Process Waste
Subissue: STABILIZATION AS BDAT OPTION
Comment:

If EPA has insufficient data on mercury stabilization to set a numerical treatment standard, the HWTC recommends a technology specific BDAT standard of "stabilization as a mercury sulfide". The stability of mercury sulfide is well established, demonstrated and documented in numerous chemical and environmental technology publications. If EPA still feels the need to persist in setting BDAT on the basis of thermal recovery, then EPA should also set an alternate BDAT of "Stabilization to a mercury sulfide precipitate". This is because the extensive comments provided the docket critiquing thermal recovery make it clear that there are numerous D009, K106 waste forms that are not amenable to thermal recovery. A few of these commenters are summarized below:

Olin Chemical Corp.	Docket No. 00124
Pioneer Chlor Alkali Co.	Docket No. 00265
PPG Industries	Docket No. 00133
Vulcan Chemicals	Docket No. 00128

All of these commenters support a standard based on stabilization as opposed to retorting. To put it as Olin expressed it, the fate of all of the mercury stabilized as a mercury sulfide is accounted for, whereas the fate of the mercury in thermal recovery is unknown or literally up in the air! The PEI study could only account for 70% of the mercury, most of which was captured as a salt in various portions of the APCE residuals, and not recovered in elemental form. This also implies that EPA should not arbitrarily set a threshold requiring mercury recovery on the basis of how low in mercury content the residuals are. EPA must allow an option for industry to properly manage those mercury wastes that are not amenable to thermal recovery. Vulcan accurately points out in their comments that debris waste contaminated with mercury is not amenable to thermal recovery (see page 6).

COMMENT NUMBER: 31-E-9
DOCKET NUMBER: LD12-L0034
COMMENTER: HAZARDOUS WASTE TREATMENT COUNCIL
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Stabilization as BDAT Option
RESPONSE:

This commenter, as well as other commenters, believes that the proposed thermal recovery standard is not needed for mercury-containing wastes in the proposed high-mercury subcategory that are generated as mercury sulfides. The commenters emphasize that because these wastes contain mercury in the form of mercury sulfide, a relatively insoluble and and immobile form of mercury under most conditions, disposal of these wastes is environmentally sound and thus, EPA should deem these wastes to meet BDAT, as generated. Another issue raised by the commenter is that thermal recovery may result in increased emissions of mercury to air and also may result in recovery residuals that contain a more leachable form of mercury than the untreated waste.

EPA has evaluated the various comments carefully but has determined that treatment standards for those mercury wastes amenable to recovery (i.e., high-mercury subcategory wastes) should be based on recovery technologies. EPA has determined that thermal recovery is a demonstrated technology for high-mercury subcategory wastes (i.e., contain 260 mg/kg or greater mercury) as explained in the Background Document and in the response to comments for subissue 10-B. There is a strong preference in the land disposal restrictions for treatment standards to be based on recovery where possible (e.g., S. Rep. No. 284 at 17). This preference is reinforced by the overall goals of RCRA to encourage waste minimization and resource recovery (e.g., RCRA section 1003(a) (6)). For wastes in the low-mercury subcategory (i.e., contain less than 260 mg/kg of mercury), BDAT has been promulgated as 0.2 mg/l as measured by TCLP).

COMMENT NUMBER: 31-E-9 (continued)
DOCKET NUMBER: LD12-L0034
COMMENTER: HAZARDOUS WASTE TREATMENT COUNCIL
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Stabilization as BDAT Option
RESPONSE:

The Agency further concludes that compliance with the mercury NESHAP, PSD BACT/LAER controls, or installation of the control technologies on which the standards are based, will ensure that point source air emissions of mercury are contolled so as to be protective of human health and the environment.

EPA has also considered the argument that wastes from retorting will contain a more leachable form of mercury than at least the mercury sulfide wastes being retorted. Although this will be true in some cases, leachable mercury in retorting wastes will still be at low levels, and well below the characteristic level. More important, there will be less mercury to leach over time because most mercury will be recovered as product. Thus, overall potential of disposed mercury to be released to the environment will be significantly reduced. Retorting/roasting also achieves volumetric waste reduction compared to stabilization because it reduces the overall volume of waste to be disposed, unlike stabilization which increases it.

The commenter also refers to stabilization data provided in a previous submission to EPA. This data submission is addressed in response 10-D-1.

Comment Number: 31-F-1
Docket Number: LD12-00129
Commenter: Olin Chemicals
Issue: Mercury Cell Process Waste
Subissue: Retain Existing BDAT Standard for K071 Nonwastewater
Comment:

Total mercury concentrations in untreated K071 non-wastewaters are typically very low. The average total mercury concentration ranges from 25 to 120 mg/kg. It has not been proven technically possible to recover elemental mercury from K071. The Agency assumes that retorting will recover elemental mercury from K071. In fact, it may be very difficult to recover any elemental mercury from K071 due to its low concentration and the mercury complexes present. Also, additional environmental problems may be created in other media (air, water, solid waste) as previously discussed.

Olin supports the 25 µg/l TCLP limit based on acid leaching as the BDAT for K071 non-wastewaters. This limit was originally promulgated as BDAT for K071 non-wastewaters in the First Third Land Disposal Restriction regulations on August 17, 1988. Acid leaching is a currently developed, available, and demonstrated technology which substantially reduces mercury concentrations in K071 non-wastewaters. Acid leaching has also been demonstrated to be an effective treatment technology for other low mercury containing wastes. In addition to acid leaching, stabilization has been demonstrated as an effective treatment method for obtaining the 25 µg/l TCLP for low level K071 non-wastewaters.

Maintaining the 25 µg/l TCLP limit for both the proposed high and low mercury subcategories of K071 wastes will reduce some of the developmental work load on the retorting system which would still be required for treating K106 and D009 non-wastewaters.

COMMENT NUMBER: 31-F-1

DOCKET NUMBER: LD12-00129

COMMENTER: OLIN CHEMICALS

ISSUE: Mercury Cell Process Waste (K071, K106)

SUBISSUE: Retain Existing BDAT Standard for K071 Nonwastewater

RESPONSE:

In the proposed rule (54 FR 48442), EPA proposed that certain K071 nonwastewaters be retorted or roasted. This commenter, as well as others, have submitted comments to EPA emphasizing that existing treatment standards should not be revised. These commenters point out that K071 wastes alredy have low concentrations of mercury (less than 120mg/kg on average) which EPA had deemed to meet the requirements of 3004(m) of HWSA. They believe these low mercury concentrations are unattractive for thermal recovery and that thermal recovery has not been demonstrated for these wastes.

Although EPA believes these wastes can be treated by roasting/retorting, EPA is not adopting the proposed revisions because their recyclability is questionable. The existing BDAT standard for K071 nonwastewaters will be retained (53 FR 31166). However, this decision does not preclude the Agency from revising the treatment standard if new data become available.

Comment Number: 31 - F - 2
Docket Number: LD12-00132
Commenter: The Chlorine Institute
Issue: Mercury Cell Process Waste
Subissue: Retain Existing BDAT Standard for K071 Nonwastewater
Comment:

Acid leaching as BDAT for both high and low mercury subcategorized K071 nonwastewaters should be adopted as originally promulgated on August 17, 1988.

B. K071 Comments

The total mercury concentration in untreated K071 nonwastewaters is typically very low. The average total mercury concentration ranges from 25 to 120 mg/kg. These low concentrations make recovery of elemental mercury from retorting very difficult. Also, additional environmental problems may be created in other media (air, water) as previously discussed.

The Institute therefore supports acid leaching as the BDAT for K071 nonwastewaters. Acid leaching was originally promulgated as BDAT for K071 nonwastewaters in the First Third Land Disposal Restriction regulations on August 17, 1988. Acid leaching is a currently developed, available, and demonstrated technology which substantially reduces mercury concentrations in K071 nonwastewaters. Acid leaching has also been demonstrated to be an effective treatment technology for low mercury containing wastes.

Using acid leaching for both the proposed high and low mercury subcategories of K071 wastes will reduce some of the developmental work and load on the retorting system which will still be required for treating K106 and D009 nonwastewaters.

Also, the affected mercury cell chlor-alkali plants either currently are operating acid leaching processes or are well on the way to installing the acid leaching process for K071 nonwastewaters to meet the August 8, 1990 BDAT deadline promulgated on August 17, 1988.

COMMENT NUMBER: 31-F-2
DOCKET NUMBER: LD12-00132
COMMENTER: THE CHLORINE INSTITUTE
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Retain Existing BDAT Standard for K071 Nonwastewater
RESPONSE:

In the proposed rule (54 FR 48442), EPA proposed that certain K071 nonwastewaters be retorted or roasted. This commenter, as well as others, have submitted comments to EPA emphasizing that existing treatment standards should not be revised. These commenters point out that K071 wastes alredy have low concentrations of mercury (less than 120mg/kg on average) which EPA had deemed to meet the requirements of 3004(m) of HWSA. They believe these low mercury concentrations are unattractive for thermal recovery and that thermal recovery has not been demonstrated for these wastes.

Although EPA believes these wastes can be treated by roasting/retorting, EPA is not adopting the proposed revisions because their recyclability is questionable. The existing BDAT standard for K071 nonwastewaters will be retained (53 FR 31166). However, this decision does not preclude the Agency from revising the treatment standard if new data become available.

Comment Number: 31-F-3
Docket Number: LD12-00251
Commenter: BF Goodrich
Issue: Mercury Cell Process Waste
Subissue: Retain Existing BDAT Standard
Comment: for K071 Nonwastewater

Acid leaching as BDAT for both high and low mercury subcategorized K-071 non-wastewaters should be adopted as originally promulgated on August 17, 1988.

COMMENT NUMBER: 31-F-3
DOCKET NUMBER: LD12-00251
COMMENTER: B.F. GOODRICH
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Retain Existing BDAT Standard for K071 Nonwastewater
RESPONSE:

In the proposed rule (54 FR 48442), EPA proposed that certain K071 nonwastewaters be retorted or roasted. This commenter, as well as others, have submitted comments to EPA emphasizing that existing treatment standards should not be revised. These commenters point out that K071 wastes alredy have low concentrations of mercury (less than 120mg/kg on average) which EPA had deemed to meet the requirements of 3004(m) of HWSA. They believe these low mercury concentrations are unattractive for thermal recovery and that thermal recovery has not been demonstrated for these wastes.

Although EPA believes these wastes can be treated by roasting/retorting, EPA is not adopting the proposed revisions because their recyclability is questionable. The existing BDAT standard for K071 nonwastewaters will be retained (53 FR 31166). However, this decision does not preclude the Agency from revising the treatment standard if new data become available.

COMMENT NUMBER: 31-F-4
DOCKET NUMBER: LD12-00258
COMMENTER: AKZO CHEMICALS INC.
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Retain Existing BDAT Standard for K071 Nonwastewater
RESPONSE:

In the proposed rule (54 FR 48442), EPA proposed that certain K071 nonwastewaters be retorted or roasted. This commenter, as well as others, have submitted comments to EPA emphasizing that existing treatment standards should not be revised. These commenters point out that K071 wastes alredy have low concentrations of mercury (less than 120mg/kg on average) which EPA had deemed to meet the requirements of 3004(m) of HWSA. They believe these low mercury concentrations are unattractive for thermal recovery and that thermal recovery has not been demonstrated for these wastes.

Although EPA believes these wastes can be treated by roasting/retorting, EPA is not adopting the proposed revisions because their recyclability is questionable. The existing BDAT standard for K071 nonwastewaters will be retained (53 FR 31166). However, this decision does not preclude the Agency from revising the treatment standard if new data become available.

Comment Number: 31-F-5
Docket Number: L012-00265
Commenter: Pioneer
Issue: Mercury Cell Process Waste
Subissue: Retain Existing BDAT Standard for K071 Nonwastewater
Comment:

Acid leaching as BDAT for K071 non-wastewaters should be maintained as originally promulgated on August 17, 1988.

K071 Comments

The total mercury concentration in untreated K071 non-wastewaters is typically very low. The average total mercury concentration ranges from 25 to 120 mg/kg. These low concentrations make recovery of elemental mercury from retorting very difficult. Also, additional environmental problems may be created in other media (air, water) as previously discussed.

Pioneer therefore supports acid leaching as the BDAT for K071 non-wastewaters. Acid leaching was originally promulgated as BDAT for K071 non-wastewaters in the First Third Land Disposal Restriction regulations on August 7, 1988. Acid leaching is a currently developed, available, and demonstrated technology which substantially reduces mercury concentrations in K071 non-wastewaters. Acid leaching has also been demonstrated to be an effective treatment technology for low mercury containing wastes.

Using acid leaching for both the proposed high and low mercury subcategories of K071 wastes will reduce some of the developmental work and load on the retorting system which will still be required for treating K106 and D009 non-wastewaters.

COMMENT NUMBER: 31-F-5
DOCKET NUMBER: LD12-00265
COMMENTER: PIONEER
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Retain Existing BDAT Standard for K071 Nonwastewater
RESPONSE:

In the proposed rule (54 FR 48442), EPA proposed that certain K071 nonwastewaters be retorted or roasted. This commenter, as well as others, have submitted comments to EPA emphasizing that existing treatment standards should not be revised. These commenters point out that K071 wastes alredy have low concentrations of mercury (less than 120mg/kg on average) which EPA had deemed to meet the requirements of 3004(m) of HWSA. They believe these low mercury concentrations are unattractive for thermal recovery and that thermal recovery has not been demonstrated for these wastes.

Although EPA believes these wastes can be treated by roasting/retorting, EPA is not adopting the proposed revisions because their recyclability is questionable. The existing BDAT standard for K071 nonwastewaters will be retained (53 FR 31166). However, this decision does not preclude the Agency from revising the treatment standard if new data become available.

Comment Number: 31-F-6
Docket Number: L012-00186
Commenter: LCP Chemicals
Issue: Mercury Cell Process Waste
Subissue: Retain Existing BDAT Standard for K071 Nonwastewater
Comment:

Acid leaching as BDAT for both high and low mercury subcategorized K071 non-wastewaters should be adopted as originally promulgated on August 17, 1988.

COMMENT NUMBER: 31-F-6
DOCKET NUMBER: LD12-00186
COMMENTER: LCP CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Retain Existing BDAT Standard for K071 Nonwastewater
RESPONSE:

In the proposed rule (54 FR 48442), EPA proposed that certain K071 nonwastewaters be retorted or roasted. This commenter, as well as others, have submitted comments to EPA emphasizing that existing treatment standards should not be revised. These commenters point out that K071 wastes alredy have low concentrations of mercury (less than 120mg/kg on average) which EPA had deemed to meet the requirements of 3004(m) of HWSA. They believe these low mercury concentrations are unattractive for thermal recovery and that thermal recovery has not been demonstrated for these wastes.

Although EPA believes these wastes can be treated by roasting/retorting, EPA is not adopting the proposed revisions because their recyclability is questionable. The existing BDAT standard for K071 nonwastewaters will be retained (53 FR 31166). However, this decision does not preclude the Agency from revising the treatment standard if new data become available.

Comment Number: 31-G-1
Docket Number: LD12-00040
Commenter: OXYCHEM
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: RECONSIDERATION OF RETORT CUTOFF LEVEL
Comment:

At this time, OxyChem is submitting new data on thermal desorption of mercury from wastes at its Muscle Shoals facility in Sheffield, Alabama. EPA's proposed BDAT Background Document for Mercury Wastes identified pilot plant data submitted by this facility as one of three data sets reviewed by the EPA.

The attached table represents the results of retorting K106 (hydrazine) waste in which the EP toxicity level for mercury in the retorted residual was measured below 65 ppb. At this level, the K106 retort residual has been determined to be non-hazardous by EPA rulemaking. The data demonstrates the variability of total mercury in the residual, ranging from 10 mg/kg to 1564 mg/kg with an average of 264 mg/kg.

This data does not support the proposed 16 mg/kg level at which wastes would require thermal treatment. Should thermal treatment be identified at BDAT in final rulemaking, it is requested that this data be included in EPA's determination of "high/low" mercury levels.

Comment Number: 31-G-1
Docket Number: LD12-00040
Commenter: OXYCHEM
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: RECONSIDERATION OF RETORT CUTOFF LEVEL
Comment:

RETORT TEST SUMMARY

Muscle Shoals Plant - Wastewater Filter Cake Sludge

	TOTAL MERCURY	
	BEFORE (ppm)	AFTER * (ppm)
08-Sep-88	9825	167.5
08-Sep-88	7375	637.5
13-Sep-88	8200	470.0
27-Sep-88	8750	375.0
17-Oct-88	32000	124.0
17-Oct-88	27000	205.5
31-Oct-88	7875	40.0
03-Nov-88	17325	104.0
07-Nov-88	7375	60.5
08-Nov-88	7125	45.0
22-Nov-88	5275	60.0
05-Dec-88	5275	110.0
06-Dec-88	5400	27.3
13-Dec-88	4600	41.8
28-Dec-88	3780	87.5
16-Jan-89	4390	41.3
30-Jan-89	3420	10.5
31-Jan-89	4280	544.3
11-Apr-89	9640	362.8
02-May-89	5800	1214.0
08-May-89	6300	124.5
12-Jun-89	6933	268.0
12-Jun-89	7200	560.0
27-Jun-89	8000	240.0
13-Jul-89	6200	77.5
24-Jul-89	5100	222.5
31-Jul-89	5205	104.0
07-Aug-89	9100	765.0
14-Aug-89	5650	62.5
21-Aug-89	2600	52.5
05-Sep-89	3010	29.5
12-Sep-89	5480	350.0
18-Sep-89	6050	51.0
25-Sep-89	4500	1564.0
11-Oct-89	6100	39.2

* All runs contained less than 65 ppb leachable mercury as analyzed by the EPA method.

COMMENT NUMBER: 31-G-1
DOCKET NUMBER: LD12-00040
COMMENTER: OXYCHEM
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Reconsideration of Retort Cutoff Level
RESPONSE:

In the proposed rule (54 FR 48440), EPA proposed a cutoff level of 16 mg/kg of total mercury to delineate two subcategories of mercury content, high and low, with high mercury wastes being required to meet a BDAT standard based of retorting or roasting. The 16 mg/kg cutoff level was calculated from two sets of retorting/roasting data collected by EPA. One data set is based on the results of retorting/roasting of mercury chloride/mercury sulfide wastes (mixture of K071 and K106) and the other data set is based on the thermal processing of cinnabar ores which the Agency considers as transferrable to the retorting/roasting of mercury sulfide sludges (i.e., K106 nonwastewaters). EPA relied on the mercury concentration data in the treated residuals from the retorting/roasting to derive the proposed cutoff.

This commenter, as well as others, have submitted comments and data urging EPA to reconsider the proposed cutoff level for several reasons. EPA finds the comments on this point persuasive. Based on these comments, therefore, EPA is revising the cutoff level from the proposed 16 mg/kg to 260 mg/kg. The new cutoff level is based on the lowest untreated waste mercury concentration for which retorting has been demonstrated (255 mg/kg rounded to 260 mg/kg).

EPA stresses that this new cutoff level should not be viewed as a relaxation of the standard or treatability group. Instead, the new cutoff level takes into account consistency in identifying treatability groups and the variability inherent to mercury sulfide wastes. The new cutoff level still recognizes that well-designed

COMMENT NUMBER: 31-G-1 (Continued)
DOCKET NUMBER: LD12-00040
COMMENTER: OXYCHEM
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Reconsideration of Retort Cutoff Level
RESPONSE:

and operated thermal recovery processes will allow routine recovery of mercury from wastes with high mercury concentrations (i.e., 260 mg/kg or greater).

The commenter also provided EP leachate results for 35 retorted K106 hydrazine sludges. The data from this submission were not used to calculate a standard because EPA believes that the hydrazine sludge generated by this facility may not be representative of the mercury sulfide sludgwastes generated at other mercury cell chlor-alkali facilities. However, if a standard were calculated from these data, it would have been 0.12 mg/l.

Comment Number: 31-G-2
Docket Number: LD12-00128
Commenter: VULCAN CHEMICALS
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: RECONSIDERATION OF RETORT CUTOFF LEVEL
Comment:

As to the Agency's determination as to the difference between High and Low Mercury Subcategories, it is our understanding that the value of 16 mg/kg is based on the analysis of the residue from the unsuccessful attempt to recover mercury by retorting a mixture of K071 and K106. It also our understanding that the process involving the retorting of cinnabar ore to produce mercury, the average mercury content of the retort residue was about 31.5 mg/kg and by correcting this for a variability factor of 5.1, the level of mercury in the High Mercury Subcategory should be about 160 mg/kg, as compared to the proposed 16 mg/kg. This assumes that waste at the 160 mg/kg level will be reduced in mercury concentration and will yield recovered mercury when retorted.

COMMENT NUMBER: 31-G-2
DOCKET NUMBER: LD12-00128
COMMENTER: VULCAN CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Reconsideration of Retort Cutoff Level
RESPONSE:

In the proposed rule (54 FR 48440), EPA proposed a cutoff level of 16 mg/kg of total mercury to delineate two subcategories of mercury content, high and low, with high mercury wastes being required to meet a BDAT standard based of retorting or roasting. The 16 mg/kg cutoff level was calculated from two sets of retorting/roasting data collected by EPA. One data set is based on the results of retorting/roasting of mercury chloride/mercury sulfide wastes (mixture of K071 and K106) and the other data set is based on the thermal processing of cinnabar ores which the Agency considers as transferrable to the retorting/roasting of mercury sulfide sludges (i.e., K106 nonwastewaters). EPA relied on the mercury concentration data in the treated residuals from the retorting/roasting to derive the proposed cutoff.

This commenter, as well as others, have submitted comments and data urging EPA to reconsider the proposed cutoff level for several reasons. EPA finds the comments on this point persuasive. Based on these comments, therefore, EPA is revising the cutoff level from the proposed 16 mg/kg to 260 mg/kg. The new cutoff level is based on the lowest untreated waste mercury concentration for which retorting has been demonstrated (255 mg/kg rounded to 260 mg/kg).

EPA stresses that this new cutoff level should not be viewed as a relaxation of the standard or treatability group. Instead, the new cutoff level takes into account consistency in identifying treatability groups and the variability inherent to mercury sulfide wastes. The new cutoff level still recognizes that well-designed

COMMENT NUMBER: 31-G-2 (Continued)
DOCKET NUMBER: LD12-00128
COMMENTER: VULCAN CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Reconsideration of Retort Cutoff Level
RESPONSE:

and operated thermal recovery processes will allow routine recovery of mercury from wastes with high mercury concentrations (i.e., 260 mg/kg or greater).

Comment Number: 31-G-3
Docket Number: LD12-00129
Commenter: OLIN CHEMICALS
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: RECONSIDERATION OF RETORT CUTOFF LEVEL
Comment:

The proposed regulations include a 16 mg/kg total mercury cutoff limit for retorting K071, K106 and D009 non-wastewaters. The proposed total mercury standard of 16 mg/kg is based, not on the McDermitt operation, but on a system using 95% K071 and only 5% K106 as a feed stock. This is significantly different from a 100% K106 feed

Also, the system on which the standard is based appears not to have been successful in recovering any mercury.

The McDermitt Mine (cinnabar ores) data provides a 31.5 ppm average mercury concentration of the treated material. Using USEPA's publication "Methodology for Developing BDAT Treatment Standards" (USEPA 1989a) and applying the calculated 3.5 variability factor to this average mercury concentration results in a treatment standard in the range of 110 to 120 ppm. Applying USEPA's variability factor of 5.1 to this average mercury concentration results in a treatment standard of 160 ppm. If the Agency maintains retorting for mercury wastes, Olin supports a higher retorting cutoff limit in the 120-150 mg/kg range as supported by QA/QC data.

Retorting mercury wastes with higher mercury concentrations provides a much greater opportunity for achieving actual mercury recovery and a decrease of mercury in the waste. Since recovery of the hazardous constituent is an important consideration in developing BDAT, retorting mercury wastes with higher mercury concentrations is also consistent with BDAT methodology.

COMMENT NUMBER: 31-G-3

DOCKET NUMBER: LD12-00129

COMMENTER: OLIN CHEMICALS

ISSUE: Mercury Cell Process Waste (K071, K106)

SUBISSUE: Reconsideration of Retort Cutoff Level

RESPONSE:

In the proposed rule (54 FR 48440), EPA proposed a cutoff level of 16 mg/kg of total mercury to delineate two subcategories of mercury content, high and low, with high mercury wastes being required to meet a BDAT standard based of retorting or roasting. The 16 mg/kg cutoff level was calculated from two sets of retorting/roasting data collected by EPA. One data set is based on the results of retorting/roasting of mercury chloride/mercury sulfide wastes (mixture of K071 and K106) and the other data set is based on the thermal processing of cinnabar ores which the Agency considers as transferrable to the retorting/roasting of mercury sulfide sludges (i.e., K106 nonwastewaters). EPA relied on the mercury concentration data in the treated residuals from the retorting/roasting to derive the proposed cutoff.

This commenter, as well as others, have submitted comments and data urging EPA to reconsider the proposed cutoff level for several reasons. EPA finds the comments on this point persuasive. Based on these comments, therefore, EPA is revising the cutoff level from the proposed 16 mg/kg to 260 mg/kg. The new cutoff level is based on the lowest untreated waste mercury concentration for which retorting has been demonstrated (255 mg/kg rounded to 260 mg/kg).

EPA stresses that this new cutoff level should not be viewed as a relaxation of the standard or treatability group. Instead, the new cutoff level takes into account consistency in identifying treatability groups and the variability inherent to mercury sulfide wastes. The new cutoff level still recognizes that well-designed

COMMENT NUMBER: 31-G-3 (Continued)
DOCKET NUMBER: LD12-00129
COMMENTER: OLIN CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Reconsideration of Retort Cutoff Level
RESPONSE:

and operated thermal recovery processes will allow routine recovery of mercury from wastes with high mercury concentrations (i.e., 260 mg/kg or greater).

Comment Number: 31-G-4
Docket Number: LD12-00186
Commenter: LCP CHEMICALS
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: RECONSIDERATION OF RETORT CUTOFF LEVEL
Comment:

The minimum mercury concentration in untreated waste subject to retorting should be set at a high enough level that allows for actual recovery. The Institute has recommended that this level be no less than 160 mg/Kg as is supported by the November 1989 Background Document For Mercury Waste.

COMMENT NUMBER: 31-G-4
DOCKET NUMBER: LD12-00186
COMMENTER: LCP CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Reconsideration of Retort Cutoff Level
RESPONSE:

In the proposed rule (54 FR 48440), EPA proposed a cutoff level of 16 mg/kg of total mercury to delineate two subcategories of mercury content, high and low, with high mercury wastes being required to meet a BDAT standard based of retorting or roasting. The 16 mg/kg cutoff level was calculated from two sets of retorting/roasting data collected by EPA. One data set is based on the results of retorting/roasting of mercury chloride/mercury sulfide wastes (mixture of K071 and K106) and the other data set is based on the thermal processing of cinnabar ores which the Agency considers as transferrable to the retorting/roasting of mercury sulfide sludges (i.e., K106 nonwastewaters). EPA relied on the mercury concentration data in the treated residuals from the retorting/roasting to derive the proposed cutoff.

This commenter, as well as others, have submitted comments and data urging EPA to reconsider the proposed cutoff level for several reasons. EPA finds the comments on this point persuasive. Based on these comments, therefore, EPA is revising the cutoff level from the proposed 16 mg/kg to 260 mg/kg. The new cutoff level is based on the lowest untreated waste mercury concentration for which retorting has been demonstrated (255 mg/kg rounded to 260 mg/kg).

EPA stresses that this new cutoff level should not be viewed as a relaxation of the standard or treatability group. Instead, the new cutoff level takes into account consistency in identifying treatability groups and the variability inherent to mercury sulfide wastes. The new cutoff level still recognizes that well-designed

COMMENT NUMBER: 31-G-4 (Continued)
DOCKET NUMBER: LD12-00186
COMMENTER: LCP CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Reconsideration of Retort Cutoff Level
RESPONSE:

and operated thermal recovery processes will allow routine recovery of mercury from wastes with high mercury concentrations (i.e., 260 mg/kg or greater).

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Comment Number: 31-G-5

Docket Number: LD12-00251

Commenter: BF GOODRICH

Issue: MERCURY CELL PROCESS WASTE (K071, K106)

Subissue: RECONSIDERATION OF RETORT CUTOFF LEVEL

Comment:

The minimum mercury concentration of untreated waste subject to retorting should be set at a high enough level to allow for actual recovery. Recommend this level be no less than 160 mg/kg, as is supported by BDAT (McDermitt Mine).

The proposed regulations include a 16 mg/kg total mercury cutoff limit for retorting K-071, K-106 and D-009 non-wastewaters. In establishing this level, the EPA cites concentrations of mercury found in the residue of thermally treated material. However, apparently not taken into account was the environmental tradeoff from retorting waste at or near this concentration, where little or no recovery will be achieved. Accordingly, to justify retorting environmentally, the cutoff level should be established at a mercury concentration in the untreated material high enough to provide a greater opportunity to achieve both actual recovery and a significant decrease of mercury in the waste. The establishment of a higher mercury cutoff is also consistent with EPA's own BDAT methodology that was established which indicated that recovery of the hazardous constituent is an important consideration in developing BDAT. Thus, B. F. Goodrich recommends that this cutoff level be set at no less than 160 mg/kg.

In addition, the proposed standard based on residual concentration in treated material was based not on the McDermitt operations, but on a system using 95% K-071 and only 5% K-106 as a feed stock.(Mercury Recovery From Contaminated

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Comment Number: 31-G-5
Docket Number: LD12-00251
Commenter: BF GOODRICH
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: RECONSIDERATION OF RETORT CUTOFF LEVEL
Comment:

Wastes and Sludges, EPA document 66012-74-086, Dec. 1974). This is significantly different from a 100% K-106 feed. Also, the system was proven not to be commercially operable, and no mercury was recovered. The system was subsequently abandoned. Nor was the study supported by QA/QC data. Using the McDermitt Mine (cinnabar ores) data provides a 31.5 mg/kg average mercury concentration of the treated material. Applying EPA's variability factor of 5.1 to this average mercury concentration results in a treatment standard of 160 mg/kg reflected in the proposed rules. The figures used in this calculation are supported by QA/QC data.

COMMENT NUMBER: 31-G-5
DOCKET NUMBER: LD12-00251
COMMENTER: B.F. GOODRICH
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Reconsideration of Retort Cutoff Level
RESPONSE:

In the proposed rule (54 FR 48440), EPA proposed a cutoff level of 16 mg/kg of total mercury to delineate two subcategories of mercury content, high and low, with high mercury wastes being required to meet a BDAT standard based of retorting or roasting. The 16 mg/kg cutoff level was calculated from two sets of retorting/roasting data collected by EPA. One data set is based on the results of retorting/roasting of mercury chloride/mercury sulfide wastes (mixture of K071 and K106) and the other data set is based on the thermal processing of cinnabar ores which the Agency considers as transferrable to the retorting/roasting of mercury sulfide sludges (i.e., K106 nonwastewaters). EPA relied on the mercury concentration data in the treated residuals from the retorting/roasting to derive the proposed cutoff.

This commenter, as well as others, have submitted comments and data urging EPA to reconsider the proposed cutoff level for several reasons. EPA finds the comments on this point persuasive. Based on these comments, therefore, EPA is revising the cutoff level from the proposed 16 mg/kg to 260 mg/kg. The new cutoff level is based on the lowest untreated waste mercury concentration for which retorting has been demonstrated (255 mg/kg rounded to 260 mg/kg).

EPA stresses that this new cutoff level should not be viewed as a relaxation of the standard or treatability group. Instead, the new cutoff level takes into account consistency in identifying treatability groups and the variability inherent to mercury sulfide wastes. The new cutoff level still recognizes that well-designed

COMMENT NUMBER: 31-G-5 (Continued)
DOCKET NUMBER: LD12-00251
COMMENTER: B.F. GOODRICH
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Reconsideration of Retort Cutoff Level
RESPONSE:

and operated thermal recovery processes will allow routine recovery of mercury from wastes with high mercury concentrations (i.e., 260 mg/kg or greater).

Comment Number: 31-G-6

Docket Number: LD12-00138

Commenter: OXYCHEM

Issue: MERCURY CELL PROCESS WASTE (K071, K106)

Subissue: RECONSIDERATION OF RETORT CUTOFF LEVEL

Comment:

The Agency Has Proposed Recovery as a Treatment Standard for D009. K071 and K106 Wastes Containing Greater Than 16 mg/kg of Mercury. This Is Based on the Concentration of Mercury in the Residue From Thermal Recovery. The Concentration in the Residue From a Thermal Recovery Process Is Not a Basis For Determining the Lowest Concentration in the Untreated Waste at Which Recovery Will Be Practical.

The Agency has proposed a standard for D009, K071 and K106 nonwastewaters that requires thermal recovery for wastes containing higher than 16 mg/kg of mercury (54 Fed. Reg. 48400). This concentration was measured in the residue from the recovery of mercury from K071 and K106 wastes, in a study that was conducted 16 years ago. The unit which was used for the study has not operated for several years. In addition, EPA states in its Background Document that no QC/QA information was provided with this test data.

The value of 16 mg/kg was derived from a measurement of mercury in the residue from the treatment of a K071/K106 combined waste. Retort data was submitted to the Agency in previous comments, and in a meeting held between The Chlorine Institute and the EPA on December 21, 1989.

The Agency also cites cinnabar (mercury ore) as containing 100 mg/kg mercury after roasting, and not leaching mercury above the EP toxicity levels.

Neither of these concentrations are satisfactory technical bases for establishing the lower level of practicality for thermal recovery of mercury from D009, K071 and K106 nonwastewaters. EPA seems to have confused residue levels with concentrations in the untreated wastes. In the proposed standards for D008 nonwastewaters, the Agency at least was able to distinguish between recoverable concentrations in the untreated waste and the concentrations that remain in the residuals from the recovery process. Residue concentrations of a metal cannot serve as the basis for demonstrating untreated waste concentrations that are conducive to recovery. In fact, OxyChem believes that the Agency's proposed cutoff level for mercury recovery from D009 wastes is a violation of the BDAT methodology that EPA has established.

By basing the proposed cutoff for recoverable wastes on the residue, the Agency has not demonstrated the effectiveness of recovery, and therefore has not shown recovery to be a demonstrated technology for wastes containing low concentrations of mercury.

If the Agency promulgates a rule for D009, K071 and K106 wastes based on a treatment methodology rather than the characteristic level, it should develop the cutoff concentration for the application of recovery to mercury-containing wastes on the concentrations of mercury in the untreated wastes that are subjected to thermal recovery.

COMMENT NUMBER: 31-G-6
DOCKET NUMBER: LD12-00138
COMMENTER: OXYCHEM
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Reconsideration of Retort Cutoff Level
RESPONSE:

In the proposed rule (54 FR 48440), EPA proposed a cutoff level of 16 mg/kg of total mercury to delineate two subcategories of mercury content, high and low, with high mercury wastes being required to meet a BDAT standard based of retorting or roasting. The 16 mg/kg cutoff level was calculated from two sets of retorting/roasting data collected by EPA. One data set is based on the results of retorting/roasting of mercury chloride/mercury sulfide wastes (mixture of K071 and K106) and the other data set is based on the thermal processing of cinnabar ores which the Agency considers as transferrable to the retorting/roasting of mercury sulfide sludges (i.e., K106 nonwastewaters). EPA relied on the mercury concentration data in the treated residuals from the retorting/roasting to derive the proposed cutoff.

This commenter, as well as others, have submitted comments and data urging EPA to reconsider the proposed cutoff level for several reasons. EPA finds the comments on this point persuasive. Based on these comments, therefore, EPA is revising the cutoff level from the proposed 16 mg/kg to 260 mg/kg. The new cutoff level is based on the lowest untreated waste mercury concentration for which retorting has been demonstrated (255 mg/kg rounded to 260 mg/kg).

EPA stresses that this new cutoff level should not be viewed as a relaxation of the standard or treatability group. Instead, the new cutoff level takes into account consistency in identifying treatability groups and the variability inherent to mercury sulfide wastes. The new cutoff level still recognizes that well-designed

COMMENT NUMBER: 31-G-6 (Continued)

DOCKET NUMBER: LD12-00138

COMMENTER: OXYCHEM

ISSUE: Mercury Cell Process Waste (K071, K106)

SUBISSUE: Reconsideration of Retort Cutoff Level

RESPONSE:

and operated thermal recovery processes will allow routine recovery of mercury from wastes with high mercury concentrations (i.e., 260 mg/kg or greater).

Comment Number: 31-G-7
Docket Number: LD12-00 258
Commenter: AKZO CHEMICALS INC.
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: RECONSIDERATION OF RETORT CUTOFF LEVEL
Comment:

The proposed regulations included a 16 mg/kg total mercury cutoff limit for retorting K071, K106 and D009 non-wastewaters. The proposed total mercury retorting cutoff limit is based on data from the 1974 retorting of a mixture of K071 and K106 (Perry, 1974). This data is not supported by QA/QC (analytical recoveries). The EPA assumes that this data was adjusted for accuracy of the analytical method used.

Using the McDermott Mine (cinnubar ores) data provides a 31.5 ppm average mercury concentration of the treated material. Applying EPA's variability factor of 5.1 to this average mercury concentration, results in a treatment standard of 160 mg/kg. The McDermott Mine data is adjusted for accuracy of the analytical method and therefore represents a data source which is more consistent with BDAT methodology.

Retorting mercury wastes at the higher mercury concentrations provides a much greater opportunity for achieving actual mercury recovery. Since recovery of the hazardous constituent is an important consideration in developing BDAT, retorting mercury wastes with higher mercury concentrations is also consistent with BDAT methodology.

Akzo supports a retorting cutoff limit in the 160 mg/kg range which is supported by QA/QC data and provides greater opportunity for actual mercury recovery.

COMMENT NUMBER: 31-G-7
DOCKET NUMBER: LD12-00258
COMMENTER: AKZO CHEMICALS INC.
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Reconsideration of Retort Cutoff Level
RESPONSE:

In the proposed rule (54 FR 48440), EPA proposed a cutoff level of 16 mg/kg of total mercury to delineate two subcategories of mercury content, high and low, with high mercury wastes being required to meet a BDAT standard based of retorting or roasting. The 16 mg/kg cutoff level was calculated from two sets of retorting/roasting data collected by EPA. One data set is based on the results of retorting/roasting of mercury chloride/mercury sulfide wastes (mixture of K071 and K106) and the other data set is based on the thermal processing of cinnabar ores which the Agency considers as transferrable to the retorting/roasting of mercury sulfide sludges (i.e., K106 nonwastewaters). EPA relied on the mercury concentration data in the treated residuals from the retorting/roasting to derive the proposed cutoff.

This commenter, as well as others, have submitted comments and data urging EPA to reconsider the proposed cutoff level for several reasons. EPA finds the comments on this point persuasive. Based on these comments, therefore, EPA is revising the cutoff level from the proposed 16 mg/kg to 260 mg/kg. The new cutoff level is based on the lowest untreated waste mercury concentration for which retorting has been demonstrated (255 mg/kg rounded to 260 mg/kg).

EPA stresses that this new cutoff level should not be viewed as a relaxation of the standard or treatability group. Instead, the new cutoff level takes into account consistency in identifying treatability groups and the variability inherent to mercury sulfide wastes. The new cutoff level still recognizes that well-designed

COMMENT NUMBER: 31-G-7 (Continued)
DOCKET NUMBER: LD12-00258
COMMENTER: AKZO CHEMICALS INC.
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Reconsideration of Retort Cutoff Level
RESPONSE:

and operated thermal recovery processes will allow routine recovery of mercury from wastes with high mercury concentrations (i.e., 260 mg/kg or greater).

Comment Number: 31-G-8
Docket Number: LD12-00265
Commenter: PIONEER
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: RECONSIDERATION OF RETORT CUTOFF LEVEL
Comment:

The proposed regulations include a 16 mg/kg cutoff limit for retorting K071, K106 and D009 non-wastewaters. Pioneer believes that this concentration limit is inappropriate for the following reasons:

The proposed regulations include a 16 mg/kg total mercury cutoff limit for retorting K071, K106 and D009 non-wastewaters. In establishing this level, the EPA cites concentrations of mercury found in the residue of thermally treated material. However, apparently not taken into account was the environmental tradeoff from retorting waste at or near this concentration where little or no recovery will be achieved. Accordingly, to environmentally justify retorting, the cutoff level should be established at a mercury concentration in the untreated material high enough to provide a greater opportunity to achieve both actual recovery and a significant decrease of mercury in the waste. The establishment of a higher mercury cutoff is also consistent with EPA's own BDAT methodology that was established which indicated that recovery of the hazardous constituent is an important consideration in developing BDAT. Thus, the Institute recommends that this cutoff level be set at no less than 160 mg/kg.

The Agency has identified the McDermitt Mine Technology as BDAT for mercury containing wastes. However, the high/low mercury waste cutoff is based not on the study of the designated BDAT technology, but on a previous study Mercury Recovery From Contaminated Waste Water and Sludges, EPA Document - 6601, 2-74-086, December, 1974, (Perry Study) Although the Perry Study is titled "Mercury Recovery . . . " there is no data reporting that any mercury was recovered from the system. The data only reports mercury level reduction in the residual ash. The system used in the Perry Study was not successful in recovering any mercury and was proven not to be commercially viable and was subsequently abandoned. In addition, the data in the Perry Study is not supported by any QA/QC data. Use of the McDermitt Mine (cinnabar ores) data provides a 31.5 ppm average mercury concentration of the treated material. Applying EPA's variability factor of 5.1 to this average mercury concentration results in a treatment standard of 160 ppm.

Retorting mercury wastes with higher mercury concentrations provides a much greater opportunity for achieving actual mercury recovery and a decrease for mercury in the waste. Since recovery of the hazardous constituent is an important consideration in developing BDAT, retorting mercury wastes with higher mercury concentrations is also consistent with BDAT methodology.

Pioneer thus supports a higher retorting cutoff limit of 160 mg/kg which is supported by QA/QC data and which proves greater opportunity for elemental mercury recovery.

COMMENT NUMBER: 31-G-8
DOCKET NUMBER: LD12-00265
COMMENTER: PIONEER
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Reconsideration of Retort Cutoff Level
RESPONSE:

In the proposed rule (54 FR 48440), EPA proposed a cutoff level of 16 mg/kg of total mercury to delineate two subcategories of mercury content, high and low, with high mercury wastes being required to meet a BDAT standard based of retorting or roasting. The 16 mg/kg cutoff level was calculated from two sets of retorting/roasting data collected by EPA. One data set is based on the results of retorting/roasting of mercury chloride/mercury sulfide wastes (mixture of K071 and K106) and the other data set is based on the thermal processing of cinnabar ores which the Agency considers as transferrable to the retorting/roasting of mercury sulfide sludges (i.e., K106 nonwastewaters). EPA relied on the mercury concentration data in the treated residuals from the retorting/roasting to derive the proposed cutoff.

This commenter, as well as others, have submitted comments and data urging EPA to reconsider the proposed cutoff level for several reasons. EPA finds the comments on this point persuasive. Based on these comments, therefore, EPA is revising the cutoff level from the proposed 16 mg/kg to 260 mg/kg. The new cutoff level is based on the lowest untreated waste mercury concentration for which retorting has been demonstrated (255 mg/kg rounded to 260 mg/kg).

EPA stresses that this new cutoff level should not be viewed as a relaxation of the standard or treatability group. Instead, the new cutoff level takes into account consistency in identifying treatability groups and the variability inherent to mercury sulfide wastes. The new cutoff level still recognizes that well-designed

COMMENT NUMBER: 31-G-8 (Continued)
DOCKET NUMBER: LD12-00265
COMMENTER: PIONEER
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Reconsideration of Retort Cutoff Level
RESPONSE:

and operated thermal recovery processes will allow routine recovery of mercury from wastes with high mercury concentrations (i.e., 260 mg/kg or greater).

Comment Number: 31-G-9

Docket Number: LD12-00132

Commenter: THE CHLORINE INSTITUTE

Issue: MERCURY CELL PROCESS WASTE (K071, K106)

Subissue: RECONSIDERATION OF RETORT CUTOFF LEVEL

Comment:

The minimum mercury concentration in untreated waste subject to retorting should be set at a high enough level that allows for actual recovery. The Institute believes this level should be no less than 160 mg/kg as is supported by the Background Document (On site Engineering Report for McDermitt Mine).

The proposed regulations include a 16 mg/kg total mercury cutoff limit for retorting K071, K106 and D009 nonwastewaters. In establishing this level, the EPA cites concentrations of mercury found in the residue of thermally treated material. However, apparently not taken into account was the environmental tradeoff from retorting waste at or near this concentration, where little or no recovery will be achieved. Accordingly, to environmentally justify retorting, the cutoff level should be established at a mercury concentration in the untreated material high enough to provide a greater opportunity to achieve both actual recovery and a significant decrease of mercury in the waste. The establishment of a higher mercury cutoff is also consistent with EPA's own BDAT methodology that was established which indicated that recovery of the hazardous constituent is an important consideration in developing BDAT. Thus, the Institute recommends that this cutoff level be set at no less than 160 mg/kg.

In addition, the proposed standard based on residual concentration in treated material was based not on the McDermitt operations, but on a system using 95% K071 and only 5% K106 as a feed stock (Mercury Recovery From Contaminated Wastes and Sludges. EPA Document 66012-74-086, Dec. 1974). This is significantly different from a 100% K106 feed. Also, the system on which the standard is based was not successful in recovering any mercury and was proven not to be operationally viable, and was subsequently abandoned. Finally, this study is not supported by QA/QC data. Using the McDermitt Mine (cinnabar ores) data provides a 31.5 mg/kg average mercury concentration of the treated material. Applying EPA's variability factor of 5.1 to this average mercury concentration results in a treatment standard of 160 mg/kg reflected in the proposed rules. The figures used in this calculation are supported by QA/QC data.

COMMENT NUMBER: 31-G-9
DOCKET NUMBER: LD12-00132
COMMENTER: THE CHLORINE INSTITUTE
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Reconsideration of Retort Cutoff Level
RESPONSE:

In the proposed rule (54 FR 48440), EPA proposed a cutoff level of 16 mg/kg of total mercury to delineate two subcategories of mercury content, high and low, with high mercury wastes being required to meet a BDAT standard based of retorting or roasting. The 16 mg/kg cutoff level was calculated from two sets of retorting/roasting data collected by EPA. One data set is based on the results of retorting/roasting of mercury chloride/mercury sulfide wastes (mixture of K071 and K106) and the other data set is based on the thermal processing of cinnabar ores which the Agency considers as transferrable to the retorting/roasting of mercury sulfide sludges (i.e., K106 nonwastewaters). EPA relied on the mercury concentration data in the treated residuals from the retorting/roasting to derive the proposed cutoff.

This commenter, as well as others, have submitted comments and data urging EPA to reconsider the proposed cutoff level for several reasons. EPA finds the comments on this point persuasive. Based on these comments, therefore, EPA is revising the cutoff level from the proposed 16 mg/kg to 260 mg/kg. The new cutoff level is based on the lowest untreated waste mercury concentration for which retorting has been demonstrated (255 mg/kg rounded to 260 mg/kg).

EPA stresses that this new cutoff level should not be viewed as a relaxation of the standard or treatability group. Instead, the new cutoff level takes into account consistency in identifying treatability groups and the variability inherent to mercury sulfide wastes. The new cutoff level still recognizes that well-designed

COMMENT NUMBER: 31-G-9 (Continued)
DOCKET NUMBER: LD12-00132
COMMENTER: THE CHLORINE INSTITUTE
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Reconsideration of Retort Cutoff Level
RESPONSE:

and operated thermal recovery processes will allow routine recovery of mercury from wastes with high mercury concentrations (i.e., 260 mg/kg or greater).

Comment Number: 31-G-10
Docket Number: LD12-00133
Commenter: PPG
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: RECONSIDERATION OF RETORT CUTOFF LEVEL
Comment:

There is no justification for establishing 16 mg/kg as the level defining the "high mercury subcategory". The successfully retorted mercury sulfide ores examined by EPA in the BDAT Background Document ranged from 47% to 74% mercury. Prior to concentration EPA indicated that the unprocessed ores contain approximately 3% mercury. For hydrazine precipitated K106 the lowest level cited by EPA in the Background Document was 2% mercury in the untreated waste. EPA has cited no information in the Background Document or preamble to its proposal to indicate that mercury can be thermally recovered when it exists in concentrations as low as 16 mg/kg. EPA should set the level defining mercury wastes subject to thermal recovery based upon the concentration of mercury in untreated waste that is amenable to reasonable recovery. While PPG has not reviewed all the data in the adminstrative record for this rule, PPG believes this level should be no less than 1000 mg/kg.

COMMENT NUMBER: 31-G-10
DOCKET NUMBER: LD12-00133
COMMENTER: PPG
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Reconsideration of Retort Cutoff Level
RESPONSE:

In the proposed rule (54 FR 48440), EPA proposed a cutoff level of 16 mg/kg of total mercury to delineate two subcategories of mercury content, high and low, with high mercury wastes being required to meet a BDAT standard based of retorting or roasting. The 16 mg/kg cutoff level was calculated from two sets of retorting/roasting data collected by EPA. One data set is based on the results of retorting/roasting of mercury chloride/mercury sulfide wastes (mixture of K071 and K106) and the other data set is based on the thermal processing of cinnabar ores which the Agency considers as transferrable to the retorting/roasting of mercury sulfide sludges (i.e., K106 nonwastewaters). EPA relied on the mercury concentration data in the treated residuals from the retorting/roasting to derive the proposed cutoff.

This commenter, as well as others, have submitted comments and data urging EPA to reconsider the proposed cutoff level for several reasons. EPA finds the comments on this point persuasive. Based on these comments, therefore, EPA is revising the cutoff level from the proposed 16 mg/kg to 260 mg/kg. The new cutoff level is based on the lowest untreated waste mercury concentration for which retorting has been demonstrated (255 mg/kg rounded to 260 mg/kg).

EPA stresses that this new cutoff level should not be viewed as a relaxation of the standard or treatability group. Instead, the new cutoff level takes into account consistency in identifying treatability groups and the variability inherent to mercury sulfide wastes. The new cutoff level still recognizes that well-designed

COMMENT NUMBER: 31-G-10 (Continued)
DOCKET NUMBER: LD12-00133
COMMENTER: PPG
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Reconsideration of Retort Cutoff Level
RESPONSE:

and operated thermal recovery processes will allow routine recovery of mercury from wastes with high mercury concentrations (i.e., 260 mg/kg or greater).

Comment Number: 31-H-1
Docket Number: LD12-00132
Commenter: THE CHLORINE INSTITUTE
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue: INDIGENOUS WASTE
Comment:

1. Status of K106, K071 and D009 Nonwastewaters as Indigenous Waste When Placed in Retorting Furnace

It is the position of the Chlorine Institute that when K106, K071 or D009 nonwastewaters are placed into a roasting or retorting furnace for the purpose of complying with the final BDAT rules, the K106, K071, or D009 (as appropriate) automatically shall be deemed "indigenous" to the furnace - - and no longer a RCRA solid wast at that point.

The Chlorine Institute has already submitted comments outlining this position in the Agency's proceeding in Docket No. F-80-BBSP-FFFFF, Burning of Hazardous Waste in Boilers and Industrial Furnaces. A copy of those comments, dated December 21, 1989, are attached hereto as Attachment 3.

December 21, 1989

RCRA Docket Section (OS-305)
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

Attn: Docket No. F-80-BBSP-FFFFF
Burning of Hazardous Waste In
Boilers and Industrial Furnaces

CHLORINE INSTITUTE COMMENTS TO THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY'S PROPOSAL ON THE DEFINITION OF "INDIGENOUS WASTE"

Introduction

The Chlorine Institute, Inc. (the "Institute"), founded in 1924, is an association of chlorine manufacturers and related companies dedicated to the promotion of safety in the production, packaging, transportation and use of chlorine. The Institute's United States members are responsible for more than 98% of this country's chlorine production, an annual figure of over 11 million tons. A substantial portion of this tonnage is produced through the electrolytic mercury cell process, which in turn generates mercury-bearing waste water treatment sludges (listed by EPA as RCRA hazardous waste K106); mercury bearing brine purification muds (listed as K071); and (in some cases) residual elemental mercury (listed as D009).

In a related rulemaking under RCRA Section 3004(m), EPA is proposing to mandate thermal recovery (roasting or retorting) as the best demonstrated available technology (BDAT) for treatment of certain K106, K071 and D009 nonwastewaters prior to land disposal. Land Disposal Restrictions for Third Scheduled Wastes, 54 Fed.Reg. 48372, November 22, 1989 (hereafter the "BDAT Proposal"). To the extent that the Agency's BDAT Proposal is ultimately adopted, it is the position of the Institute in the instant proceeding that K106, K071 and D009 nonwastewaters be deemed indigenous wastes when placed into a roasting or retorting furnace for the purpose of complying with EPA's BDAT regulations.

Comment Number: 31-H-1
Docket Number: LD12-00132
Commenter: THE CHLORINE INSTITUTE
Issue: MERCURY CELL PROCESS WASTE
Subissue: INDIGENOUS WASTE
Comment:

Discussion

As indicated, the Institute and its members are particularly concerned with one aspect of this Agency's proceeding on the burning of hazardous waste in boilers and industrial furnaces: the definition under RCRA of "indigenous" waste that is reclaimed. This interest arises from the fact that in the parallel BDAT Proposal under Section 3004(m), EPA is proposing to mandate roasting or retorting of K106, K071, and D009 nonwastewaters prior to land disposal (where the waste in question has a total mercury content greater than or equal to 16 mk/kg). 54 Fed. Reg. 48441-43.

In its original May 6, 1987 notice on burning hazardous waste in boilers and industrial furnaces, 52 Fed. Reg. 16982, EPA solicited comments on the issue of when a hazardous waste that was burned *exclusively* for materials recovery might be considered "indigenous" to the industrial furnace in which it was placed. As the Agency pointed out at that time:

> Under current regulations, hazardous spent materials, listed sludges, and listed by-products are hazardous wastes when reclaimed...[H]owever, these materials may *cease* being solid wastes at the point of burning for material recovery in industrial furnaces depending on the type of secondary material involved...To date, EPA has indicated that burning for materials recovery of secondary materials is "indigenous" to the process in which the industrial furnace is used *and is beyond the Agency's RCRA jurisdiction.*

52 Fed. Reg. 16989-90 (first emphasis in original, second emphasis supplied). In other words, where the secondary material being burned is indigenous to the industrial process for which the furnace is being used -- in this case reclamation -- regulation of the material under RCRA once the material is placed in the furnace leads to an "impermissible intrusion" into the production process. Id.; see, also 50 Fed. Reg. 49167, November 29, 1985.

However, EPA's May 6, 1987, notice proposed that "only materials generated by a process *using the same type of industrial furnace* as that in which burning occurs" would be classified as indigenous. 52 Fed. Reg. 16990 (emphasis in original). That position, in turn, ultimately raised a problem for chlorine producers one year later. On May 18, 1988, EPA first proposed roasting or retorting as the BDAT for K106, 53 Fed. Reg. 17601-02. In its notice, the Agency also opined that "K106 sludge would not be considered indigenous, under the May 6, [1987] proposal, to retort furnaces used as the basis for the proposed [BDAT] treatment standard." 53 Fed. Reg. 17602. Under that logic, the residuals produced by the furnace automatically would be deemed hazardous waste by virtue of the "derived-from" rule, 40 CFR 261.2(c), because the residual would be deemed derived-from a listed waste. Id. Conversely, as EPA pointed out, if a determination of indigenous was made for K106 in this circumstance, "it would cease to be a solid waste when it is retorted." Id. The derived-from rule thus would be inapplicable, and the residual only would be a hazardous waste if it exhibited a characteristic of a hazardous waste. Id.

As it developed, the Agency withdrew its May 1988 BDAT proposal for K106, and instead let the so-called "soft hammer" provision of Section 3004 apply. 53 Fed. Reg. 31173, August 17, 1988. But, as already discussed, this past November the Agency reproposed roasting or retorting as the mandated BDAT technology for nonwastewaters in the K106, K071, and D009 category, so that the indigenous issue also remains.

Returning to the instant proceeding on boilers and industrial furnaces, on October 29, 1989 EPA reopened the general issue of indigenous wastes. 54 Fed. Reg. 43718. EPA solicits comments on a different option from that contained in the May 1987 notice, proposing now that the test for indigenous waste "vary according to the source of the waste..." 54 Fed. Reg. 42731.

With respect to SIC code 33 industrial furnaces burning wastes generated by a process

Comment Number: 31-H-1
Docket Number: LD12-00132
Commenter: THE CHLORINE INSTITUTE
Issue: MERCURY CELL PROCESS WASTE
Subissue: INDIGENOUS WASTE
Comment:

other then SIC code 33 -- which, among other things, describes the roasting or retorting of K106, K071, and D009 -- EPA states: "the Agency is tentatively of the view that [the] material...would only be indigenous to the furnace if it contained unrecovered toxic constitutents present in the waste in insignificant concentration, i.e., less than 500 PPM for total Appendix VIII organic compounds and 500 PPM for total unreclaimed Appendix VIII toxic metals." 54 Fed. Reg. 43732.

It is the position of the Chlorine Institute that K106, K071, and D009 (nonwastewaters) must be deemed indigenous to the roasting or retorting process proposed by EPA as the BDAT technology under Section 3004(m). In the context of such thermal recovery, the relevant mercury bearing wastes are not being placed into an industrial furnace for the purpose or the effect of incineration. Neither are they being placed there for the purpose or effect (in whole or in part) of energy recovery. That being the case, the basic statutory predicate under RCRA for continued regulation of the material as listed wastes -- and, thus, continued application of the derived-from rule -- is absent once the material is placed into the furnace. See, generally EPA notices published at 50 Fed. Reg. 630, January 4, 1985; 50 Fed. Reg. 1690, January 11, 1985. Under the very terms of the Agency's own November 29, 1989 BDAT proposal (and the companion November 1989 "Background Document for Mercury Wastes"), the sole purpose and effect of placing the K106/K071/D009 into the roasting or retorting furnace is the recovery of the mercury. Indeed, that is the whole point in mandating roasting or retorting as a specified BDAT technology.

In this circumstance, the waste is placed into the furnace as an in-process material which is not discarded. Therefore, control of the burning of the material in the furnace would constitute that "impermissible intrusion into the production process" which EPA long has recognized as beyond its authority under RCRA. In this limited circumstance, the K106, K071 or D009 (as appropriate) is indigenous to the process for which the furnace is used.

Conclusion

For these reasons, while the Institute supports the thrust of the Agency's general proposal in its October 26, 1989 notice with respect to the burning in SIC code 33 industrial furnaces of wastes generated by other processes (and the recognition by EPA of the need for a defined category of indigenous waste when dealing with recovery), the Institute also urges the Agency specifically to find that where K106, K071 or D009 are placed into a roasting or retorting facility for the purpose of complying with EPA's final BDAT rules for these wastes, the K106, K071 or D009 (as appropriate) shall automatically be deemed indigenous.

Very truly yours,

Robert G. Smerko
Robert G. Smerko

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COMMENT NUMBER: 31-H-1
DOCKET NUMBER: LD12-00132
COMMENTER: THE CHLORINE INSTITUTE
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Indigenous Waste
RESPONSE:

This commenter, as well as other commenters, have raised questions concerning the issue of whether residues from the retorting/roasting of K106, K071, U151, and D009 nonwastewaters will be considered "indigenous" wastes. The following paragraphs explain the status of retorter/roaster residues according to the promulgated BDAT standards.

Under the promulgated standards, High Mercury Subcategory K106, D009 and U151 nonwastewaters (i.e., untreated wastes contain 260 mg/kg or greater total mercury) are required to be treated by roasting/retorting as a prerequisite for land disposal. For D009 wastes with an organic content initially too high for retorting/roasting, incineration should be used as a pretreatment step. Residues from retorting/roasting are not prohibited from land disposal unless they leach mercury above 0.20 mg/l, as measured by TCLP (i.e., the toxic characteristic level). Available data indicate that residues from retorting will leach mercury at levels less than 0.20 mg/l. Residues leaching more than 0.20 mg/l mercury will be required either to undergo further treatment to achieve compliance with the standard or will require a variance.

Under the promulgated standards, Low Mercury Subcategory K106 and U151 nonwastewaters (i.e., untreated wastes contain less than 260 mg/kg total mercury) must comply with a treatment standard of 0.025 mg/l as measured by TCLP. Wastes that leach less than 0.025 mg/l are considered to have met BDAT and can be land disposed. Wastes that leach 0.025 mg/l or more must be treated to achieve

COMMENT NUMBER: 31-H-1 (continued)
DOCKET NUMBER: LD12-00132
COMMENTER: THE CHLORINE INSTITUTE
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Indigenous Waste
RESPONSE:

compliance with the standard. If the nonwastewater residues formed from precipitating the acid leachate from the acid leaching process, or whatever process is selected to treat the non-compliant waste, contain 260 mg/kg or more of total mercury, then the waste must undergo retorting/roasting and comply with the appropriate standards for High Mercury Subcategory D009 nonwastewaters.

With respect to K071 nonwastewaters, EPA has decided to retain the existing promulgated standards which do not require retorting/roasting.

EPA is not addressing the issue here of whether mercury wastes being retorted would be indigenous to the retorting furnace. EPA has determined that retorting is Best Demonstrated Available Technology. Residues from a designated treatment method are no longer subject to the disposal prohibition. This determination does not rest on a finding one way or the other on the issue of indigenous. That issue is the subject of a pending rulemaking and also a pending D.C. Circuit decision in API v. EPA, no. 88-1606. The Agency will undoubtedly consider the issue further in either or both of these contexts.

Comment Number: 31-H-2
Docket Number: LD12-00265
Commenter: PIONEER
Issue: MERCURY CELL PROCESS WASTE
Subissue: INDIGENOUS WASTE
Comment:

Status of K106, K071 and D009 Non-wastewaters as Indigenous Waste When Placed in Retorting Furnace

It is the position of Pioneer that when K106, K071 and D009 non-wastewaters are placed into a roasting or retorting furnace for the purpose of complying with the final BDAT rules, the K106, K071 and D009 wastes (as appropriate) automatically shall be deemed "indigenous" to the furnace — and no longer a RCRA solid waste at that point.

Pioneer has already submitted comments outlining this position in the Agency proceeding in Docket No. F-80-BBSP-FFFFF, Burning of Hazardous Waste in Boilers and Industrial Furnaces. A copy of these comments, dated December 21, 1989, are attached hereby as Attachment 2.

PIONEER

December 21, 1989

RCRA Docket Section (OS-305)
U.S. Environmental Protection Agency
401 M Street, SW
Washington, D.C. 20460

ATTN: Docket No. F-80-BBSP-FFFFF
Burning of Hazardous Waste In
Boilers and Industrial Furnaces

PIONEER CHLOR ALKALI COMPANY, INC. COMMENTS TO THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY'S PROPOSAL ON THE DEFINITION OF "INDIGENOUS WASTE"

Introduction

Pioneer Chlor Alkali Company, Inc. (Pioneer) manufactures chlorine by the electrolytic mercury cell process at its St. Gabriel, La. facility. This process generates mercury bearing waste water treatment sludges (listed by EPA as RCRA hazardous waste K106); mercury bearing brine purification muds (listed as K071); and (in some cases) residual miscellaneous materials contaminated with elemental mercury (listed as D009).

In a related rulemaking under RCRA Section 3004(m), EPA is proposing to mandate thermal recovery (roasting or retorting) as the best demonstrated available technology ("BDAT") for treatment of certain K106, K071 and D009 nonwastewaters prior to land disposal. Land Disposal Restrictions for Third Scheduled Wastes, 54 Fed. Reg. 48372, November 22, 1989 (hereafter the "BDAT Proposal"). To the extent that the Agency's BDAT Proposal is ultimately adopted, it is the position of Pioneer in the instant proceeding that K106, K071 and D009 nonwastewaters be deemed indigenous wastes when placed into a roasting or retorting furnace for the purpose of complying with EPA's BDAT regulations.

Comment Number: 31-H-2
Docket Number: LD12-00265
Commenter: PIONEER
Issue: MERCURY CELL PROCESS WASTE
Subissue: INDIGENOUS WASTE
Comment:

Discussion

Pioneer is particularly concerned with one aspect of this proceeding on the burning of hazardous waste in boilers and industrial furnaces: the definition under RCRA of "indigenous" waste that is reclaimed. This interest arises from the fact that in the parallel BDAT Proposal under Section 3004(m), EPA is proposing to mandate roasting or retorting of K106, K071 and D009 nonwastewaters prior to land disposal (where the waste in question has a total mercury content greater than or equal to 16 mg/kg). 54 *Fed. Reg.* 48441-43.

In its original May 6, 1987 notice on burning hazardous waste in boilers and industrial furnaces, 52 *Fed. Reg.* 16982, EPA solicited comments on the issue of when a hazardous waste that was burned *exclusively* for materials recovery might be considered "indigenous" to the industrial furnace in which it was placed. As the Agency pointed out at that time:

> Under current regulations, hazardous spent materials, listed sludges, and listed by-products are hazardous wastes when reclaimed . . . [H]owever, these materials may *cease* being solid wastes at the point of burning for material recovery in industrial furnaces depending on the type of secondary material involved . . . To date, EPA has indicated that burning for materials recovery of secondary materials is "indigenous" to the process in which the industrial furnace is used *and is beyond the Agency's RCRA jurisdiction*.

52 *Fed. Reg.* 17389-90 (first emphasis in original, second emphasis supplied). In other words, where the secondary material being burned is indigenous to the industrial process for which the furnace is being used — in this case reclamation — regulation of the material under RCRA once the material is placed in the furnace leads to an "impermissible intrusion" into the production process. *Id; see. also* 50 *Fed. Reg.* 49167 November 29, 1985.

However, EPA's May 6, 1987 notice proposed that only materials generated by a process *using the same type of industrial furnace* as that in which burning occurs" would be classified as indigenous. 52 *Fed. Reg.* 16390 (emphasis in original). That position in turn, ultimately raised a problem for chlorine producers one year later. On May 18, 1988 EPA first proposed roasting or retorting as the BDAT for K106, 53 *Fed. Reg.* 17601-02. In the notice the Agency also opined that "K106 sludge would not be considered indigenous, under the May 6, [1987] proposal, to retort furnaces used as the basis for the proposed [BDAT] treatment standard." 53 *Fed. Reg.* 17602. Under that logic, the residuals produced by the furnace automatically would be deemed hazardous waste by virtue of the "derived-from" rule, 40 CFR 261.2(c), because the residual would be deemed derived-from a listed waste. *Id.* Conversely, as EPA pointed out, if a determination of indigenous was made for K106 in this circumstance, "it would cease to be a solid waste when it is retorted." *Id.* The derived-from rule thus would be inapplicable, and the residual only would be a hazardous waste if it exhibited a characteristic of a hazardous waste. *Id.*

As it developed, the Agency withdrew its May 1988 BDAT proposal for K106, and instead let the so-called "soft hammer" provision of Section 3004 apply. 53 *Fed. Reg.* 31173, August 17, 1988. but, as already discussed, this past November the Agency reproposed roasting or retorting as the mandated BDAT technology for nonwastewaters in the K106, K071 and D009 category, so that the indigenous issue also remains.

Comment Number: 31-H-2
Docket Number: LD12-00265
Commenter: PIONEER
Issue: MERCURY CELL PROCESS WASTE
Subissue: INDIGENOUS WASTE
Comment:

Returning to the instant proceeding on boilers and industrial furnaces, on October 29, 1989 EPA reopened the general issue of indigenous wastes. 54 Fed. Reg. 43718. EPA solicits comments on a different option from that contained in the May 1987 notice, proposing now that the test for indigenous waste "vary according to the source of the waste . . . " 54 Fed. Reg. 42731.

With respect to SIC code 33 industrial furnaces burning wastes generated by a process other than SIC code 33 — which, among other things, describes the roasting or retorting of K106, K071 and D009 — EPA states: "the Agency is tentatively of the view that [the] material . . . would only be indigenous to the furnace if it contained unrecovered toxic constitutents present in the waste in insignificant concentration, i.e., less than 500 PPM for total Appendix VIII organic compounds and 500 PPM for total unreclaimed Appendix VIII toxic metals." 54 Fed. Reg. 43743.

It is the position of Pioneer that K106, K071 and D009 (nonwastewaters) must be deemed indigenous to the roasting or retorting process proposed by EPA as the BDAT technology under Section 3004(m). In the context of such thermal recovery, the relevant mercury bearing wastes are not being placed into an industrial furnace for the purpose or effect of incineration. Neither are they being placed there for the purpose or effect (in whole or in part) of energy recovery. That being the case, the basic statutory predicate under RCRA for continued regulation of the

material as listed wastes — and, thus, continued application of the derived-from rule — is absent once the material is placed into the furnace. See, generally EPA notices published at 50 Fed. Reg. 630, January 4, 1985; 50 Fed. Reg. 1690, January 11, 1985. Under the very terms of the Agency's own November 29, 1989 BDAT proposal (and the companion November 1989 "Background Document for Mercury Wastes"), the sole purpose and effect of placing the K106/K071/D009 into the roasting or retorting furnace is the recovery of mercury. Indeed, that is the whole point in mandating roasting or retorting as a specified BDAT technology.

In this circumstance, the waste is placed into the furnace as an in-process material which is not discarded. Therefore, control of the burning of the material in the furnace would constitute that "impermissible intrusion into the production process" which EPA long has recognized as beyond its authority under RCRA. In this limited circumstance, the K106, K071 and D009 (as appropriate) is indigenous to the process for which the furnace is used.

Conclusion

For these reasons, while Pioneer supports the Agency's general proposal in its October 26, 1989 notice with respect to the burning in SIC code 33 industrial furnaces of wastes generated by other processes, Pioneer urges the Agency to also find that where K106, K071 or D009 are placed into a roasting or retorting facility for the purpose of complying with EPA's final BDAT rules for these wastes, the K106, K071 and D009 (as appropriate) shall automatically be deemed indigenous.

Respectfully Submitted,

B.L. Bennett

B.L. Bennett
Plant Manager

COMMENT NUMBER: 31-H-2
DOCKET NUMBER: LD12-00265
COMMENTER: PIONEER
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Indigenous Waste
RESPONSE:

This commenter, as well as other commenters, have raised questions concerning the issue of whether residues from the retorting/roasting of K106, K071, U151, and D009 nonwastewaters will be considered "indigenous" wastes. The following paragraphs explain the status of retorter/roaster residues according to the promulgated BDAT standards.

Under the promulgated standards, High Mercury Subcategory K106, D009 and U151 nonwastewaters (i.e., untreated wastes contain 260 mg/kg or greater total mercury) are required to be treated by roasting/retorting as a prerequisite for land disposal. For D009 wastes with an organic content initially too high for retorting/roasting, incineration should be used as a pretreatment step. Residues from retorting/roasting are not prohibited from land disposal unless they leach mercury above 0.20 mg/l, as measured by TCLP (i.e., the toxic characteristic level). Available data indicate that residues from retorting will leach mercury at levels less than 0.20 mg/l. Residues leaching more than 0.20 mg/l mercury will be required either to undergo further treatment to achieve compliance with the standard or will require a variance.

Under the promulgated standards, Low Mercury Subcategory K106 and U151 nonwastewaters (i.e., untreated wastes contain less than 260 mg/kg total mercury) must comply with a treatment standard of 0.025 mg/l as measured by TCLP. Wastes that leach less than 0.025 mg/l are considered to have met BDAT and can be land disposed. Wastes that leach 0.025 mg/l or more must be treated to achieve

COMMENT NUMBER: 31-H-2 (continued)
DOCKET NUMBER: LD12-00265
COMMENTER: PIONEER
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Indigenous Waste
RESPONSE:

compliance with the standard. If the nonwastewater residues formed from precipitating the acid leachate from the acid leaching process, or whatever process is selected to treat the non-compliant waste, contain 260 mg/kg or more of total mercury, then the waste must undergo retorting/roasting and comply with the appropriate standards for High Mercury Subcategory D009 nonwastewaters.

With respect to K071 nonwastewaters, EPA has decided to retain the existing promulgated standards which do not require retorting/roasting.

EPA is not addressing the issue here of whether mercury wastes being retorted would be indigenous to the retorting furnace. EPA has determined that retorting is Best Demonstrated Available Technology. Residues from a designated treatment method are no longer subject to the disposal prohibition. This determination does not rest on a finding one way or the other on the issue of indigenous. That issue is the subject of a pending rulemaking and also a pending D.C. Circuit decision in API v. EPA, no. 88-1606. The Agency will undoubtedly consider the issue further in either or both of these contexts.

Comment Number: 31-H-3

Docket Number: LD12-00129

Commenter: OLIN

Issue: MERCURY CELL PROCESS WASTE

Subissue: INDIGENOUS WASTE

Comment:

Olin recommends that if the Agency maintains the BDAT as retorting or roasting, that the residue from roasting or retorting of all mercury wastes (K106, U151, K071 and D009) be allowed to be disposed of as non-hazardous waste if the wastes are characteristically non-hazardous. The BDAT roasting or retorting proposal is based upon the proposal for indigenous thermal treatment of mercury containing wastes, thereby qualifying such treatment residue to be disposed of as non-hazardous.

COMMENT NUMBER: 31-H-3
DOCKET NUMBER: LD12-00129
COMMENTER: OLIN CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Indigenous Waste
RESPONSE:

This commenter, as well as other commenters, have raised questions concerning the issue of whether residues from the retorting/roasting of K106, K071, U151, and D009 nonwastewaters will be considered "indigenous" wastes. The following paragraphs explain the status of retorter/roaster residues according to the promulgated BDAT standards.

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Under the promulgated standards, Low Mercury Subcategory K106 and U151 nonwastewaters (i.e., untreated wastes contain less than 260 mg/kg total mercury) must comply with a treatment standard of 0.025 mg/l as measured by TCLP. Wastes that leach less than 0.025 mg/l are considered to have met BDAT and can be land disposed. Wastes that leach 0.025 mg/l or more must be treated to achieve

COMMENT NUMBER: 31-H-3 (continued)
DOCKET NUMBER: LD12-00129
COMMENTER: OLIN CHEMICALS
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Indigenous Waste
RESPONSE:

compliance with the standard. If the nonwastewater residues formed from precipitating the acid leachate from the acid leaching process, or whatever process is selected to treat the non-compliant waste, contain 260 mg/kg or more of total mercury, then the waste must undergo retorting/roasting and comply with the appropriate standards for High Mercury Subcategory D009 nonwastewaters.

With respect to K071 nonwastewaters, EPA has decided to retain the existing promulgated standards which do not require retorting/roasting.

EPA is not addressing the issue here of whether mercury wastes being retorted would be indigenous to the retorting furnace. EPA has determined that retorting is Best Demonstrated Available Technology. Residues from a designated treatment method are no longer subject to the disposal prohibition. This determination does not rest on a finding one way or the other on the issue of indigenous. That issue is the subject of a pending rulemaking and also a pending D.C. Circuit decision in API v. EPA, no. 88-1606. The Agency will undoubtedly consider the issue further in either or both of these contexts.

Comment Number: 31-H-4
Docket Number: LD12-00133
Commenter: PPG
Issue: MERCURY CELL PROCESS WASTE (K071, K106)
Subissue:
Comment:

PPG supports EPA's interpretation that K106 and U151 would be considered indigenous to a thermal recovery unit.

COMMENT NUMBER: 31-H-4
DOCKET NUMBER: LD12-00133
COMMENTER: PPG
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Indigenous Waste
RESPONSE:

This commenter, as well as other commenters, have raised questions concerning the issue of whether residues from the retorting/roasting of K106, K071, U151, and D009 nonwastewaters will be considered "indigenous" wastes. The following paragraphs explain the status of retorter/roaster residues according to the promulgated BDAT standards.

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Under the promulgated standards, Low Mercury Subcategory K106 and U151 nonwastewaters (i.e., untreated wastes contain less than 260 mg/kg total mercury) must comply with a treatment standard of 0.025 mg/l as measured by TCLP. Wastes that leach less than 0.025 mg/l are considered to have met BDAT and can be land disposed. Wastes that leach 0.025 mg/l or more must be treated to achieve

COMMENT NUMBER: 31-H-4 (continued)
DOCKET NUMBER: LD12-00133
COMMENTER: PPG
ISSUE: Mercury Cell Process Waste (K071, K106)
SUBISSUE: Indigenous Waste
RESPONSE:

compliance with the standard. If the nonwastewater residues formed from precipitating the acid leachate from the acid leaching process, or whatever process is selected to treat the non-compliant waste, contain 260 mg/kg or more of total mercury, then the waste must undergo retorting/roasting and comply with the appropriate standards for High Mercury Subcategory D009 nonwastewaters.

With respect to K071 nonwastewaters, EPA has decided to retain the existing promulgated standards which do not require retorting/roasting.

EPA is not addressing the issue here of whether mercury wastes being retorted would be indigenous to the retorting furnace. EPA has determined that retorting is Best Demonstrated Available Technology. Residues from a designated treatment method are no longer subject to the disposal prohibition. This determination does not rest on a finding one way or the other on the issue of indigenous. That issue is the subject of a pending rulemaking and also a pending D.C. Circuit decision in API v. EPA, no. 88-1606. The Agency will undoubtedly consider the issue further in either or both of these contexts.

ISSUE CODE 32: K073 - Chlorinated Hydrocarbon Wastes

No Comments Were Received for this Waste Code

ISSUE CODE 33: K086 - Residues from Ink Production

A.-. Treatment Standards
B.-. Subcategories
C.-. Total Chromium vs Hexavalent Chromium
D.-. Mixture and Derived-from Rule
E.-.Soft Hammer

Comment Number: 33-A-1

Docket Number: LD12-00116

Commenter: ThermalKem / CyanoKem

Issue: 33 - K086

Subissue: Treatment Standards

Comment:

K086 WASTES

We support the revisions to the treatment standards for K086 wastes. These standards are more representative of actual K086 waste streams.

Comment Number: 33-A-1
Docket Number: LD12-00110
Commenter: THERMALKEM/CYANOKEM
Issue: 33-K086
Subissue: Treatment Standards
Response:

The Agency acknowledges the support for the revisions to the treatment standards for K086 wastes. EPA is incorporating this approach in its final rule.

Comment Number: 33-A-2

Docket Number: LD12-00110

Commenter: ThermalKem / Cyanokem

Issue: 33 - K056

Subissue: Treatment Standards

Comment:

As with the other waste codes, we urge EPA to take into account the HWTC PQL study findings in setting BDAT standards.

COMMENT NUMBER: 33-A-2
DOCKET NUMBER: LD12-00110
COMMENTER: ThermalKEM/CyanoKEM
ISSUE: 33-K086
SUBISSUE: Treatment Standards
RESPONSE:

The Agency has used the method detection limit study submitted by the Hazardous Waste Treatment Council (HWTC) to the Agency during the comment period for the Land Disposal Restrictions Rule for Third Third Scheduled Wastes to evaluate whether industry's laboratories can reliably quantify regulated constituents at the level of both the proposed and previously promulgated concentration-based standards established for U and P waste codes. These concentration-based standards are based on incineration ash data from 14 incineration studies conducted by the Agency specifically for the Land Disposal Restrictions Program.

The intent of HWTC's study was to verify whether industry's laboratories could routinely quantify the constituents regulated for U and P waste codes and to identify the constituents which could not be quantified at the proposed or promulgated concentration-based standards. For K086, the treatment standards are being transferred from the appropriate U and P waste codes, therefore changes to the nonwastewater standards for U and P waste codes also affect the nonwastewater standards for K086. The HWTC study consisted of spiking the regulated constituents in samples of incineration ash at levels near the concentration-based standards and analyzing the samples using SW-846 methods, specifically the micro extraction technique for volatile organics followed by Method 8240 and soxhlet extraction for the semi-volatile organics followed by Method 8270. The study was conducted at six laboratories. Each laboratory analyzed seven replicates to determine the method detection limit and seven spiked samples to determine the recovery values for each constituent. The study included information on method detection limits

COMMENT NUMBER: 33-A-2 (continued)
DOCKET NUMBER: LD12-00110
COMMENTER: ThermalKEM/CyanoKEM
ISSUE: 33-K086
SUBISSUE: Treatment Standards
RESPONSE:

and recovery values. In addition, HWTC arbitrarily calculated treatment standards using their methodology, which is based on practical quantification levels (PQLs) for each constituent. HWTC defined PQLs as a value five times the method detection limit. EPA reiterates that PQLs are minimum measures of analytical laboratory performance, as defined in SW-846 for the use of laboratories in assessing their own performance in terms of success in reaching low levels of certain analytes in certain matrices. Outside of this function of providing a quantitative definition of the boundaries between poor and competent analytical performance, PQLs have no regulatory power.

Although HWTC did conduct a comprehensive method detection limit study for most of the BDAT constituents regulated in the Third Thirds Rule as well as the First and Second Thirds Rules, the following items were not presented in the documentation, thereby limiting the usefulness of the study:

- Although the six laboratories analyzed seven replicates to determine the method detection limits, data were only presented for the average from each laboratory and the pooled average value calculated from all of the data points submitted by the individual laboratories. As a result, EPA could not evaluate the precision each individual laboratory achieved for determining the detection limits nor could the range of detection limits associated with each set of replicates be examined. Therefore, EPA could not compare the precision of the HWTC data relative to EPA's and as a result could not assess HWTC's comments concerning detection limit precision.

COMMENT NUMBER: 33-A-2 (continued)

DOCKET NUMBER: LD12-00110

COMMENTER: ThermalKEM/CyanoKEM

ISSUE: 33-K086

SUBISSUE: Treatment Standards

RESPONSE:

- Characterization data for the untreated waste that was used to generate the incinerator ash used by a laboratory participating in this study were not available. As a result, EPA could not assess the incinerator burns to determine whether substantial treatment of the waste occurred or whether the ash was obtained from a waste that is more or less characteristic of the waste in question than the ash EPA analyzed to set its standards on.

- The measurable levels of both volatile and semivolatile organic constituents present in the unspiked ash suggest inadequate incinerator time or temperature and thus the ash may have been generated from incinerators that were not well operated or well-designed. The presence of these volatile and semivolatile constituents at measurable quantities in the unspiked ash may also indicate that additional matrix dependent interferences may have been present in the samples used for this study by some of the participating laboratories.

- Incinerator process documentation provided in the study was inadequate to assess whether the incinerators used to generate the ash were well-designed and operated. HWTC did provide primary and secondary chamber combustion temperatures, combustion chamber carbon monoxide content, combustion gas velocity, feed rate, halogen content, and ash content in its comment submitted to the November 22, 1989, proposed standards. The names and addresses of the incinerators generating the ash used in HWTC's study were also given. Some of them were used in several of EPA's own 14 test burns. The six incinerators participating in this study were identified as five rotary kiln incinerators and one multiple hearth incinerator. The limited process data available in the report were presented as ranges plus averages. No data on length of burn, graph charts recording the operating parameters during the incineration burns, or flow sheets of the incineration system were given. In addition, no information was provided on either the sampling point where the ash was collected or the sampling procedures used to collect the ash samples; therefore, EPA could not compare these data with the data collected from the 14 test burns conducted by EPA.

COMMENT NUMBER: 33-A-2 (continued)
DOCKET NUMBER: LD12-00110
COMMENTER: ThermalKEM/CyanoKEM
ISSUE: 33-K086
SUBISSUE: Treatment Standards
RESPONSE:

In addition, the HWTC study used different preparation methods before analyzing the samples than those used in EPA's 14 incineration studies. For volatile organics, the HWTC study used the micro extraction technique prior to analysis by SW-846 Method 8240, whereas the EPA incineration test burns used the purge and trap method prior to analysis by SW-846 Method 8240. For semivolatile organics, the HWTC study used soxhlet extraction prior to analysis by SW-846 Method 8270, whereas the EPA incineration studies used sonication prior to analysis by SW-846 Method 8270. One difference between the preparation methods used by HWTC study versus EPA's incineration burns was the sample size used in the analysis. For volatile organics, HWTC used 4 grams of sample in the micro extraction technique versus 5 grams used for purge and trap extraction. For semivolatile organics, HWTC used 10 grams for the soxhlet extraction versus 30 grams used for the sonication extraction. This difference in sample size made it difficult to compare the data from the two sources. Due to the smaller sample size used in the HWTC study, the detection limits calculated in the study would be higher than those achieved in the 14 incineration test burns conducted by EPA.

EPA also examined the recovery values presented in the HWTC study that were generated by the six laboratories from the analysis of seven replicates for each constituent. EPA used these data to reevaluate the proposed standards. If these recovery values were outside a range of 20 to 200 percent for over half of the data presented then the standards for that specific analyte were reexamined. For some analytes the HWTC data indicated that a specific laboratory may have had a problem with matrix

COMMENT NUMBER: 33-A-2 (continued)
DOCKET NUMBER: LD12-00110
COMMENTER: ThermalKEM/CyanoKEM
ISSUE: 33-K086
SUBISSUE: Treatment Standards
RESPONSE:

interferences with specific parts of the chromatograms since reported detection limits were significantly higher than the detection limits reported by the other participating laboratories and the recovery values were also not consistent with the data available from the other laboratories. These matrix interferences could be due in part to the waste that was used to generate the ash or to the incomplete combustion of the ash as supported by the concentration levels of various constituents in the unspiked ash.

Changes occurred primarily when EPA reevaluated cases where the HWTC study reported higher detection limits than those used by EPA to calculate standards. Although EPA had generally used the highest of the set of up to 14 incineration ash detection limits as the basis of the proposed standards, some exceptions have been made in the case of outliers and in cases where EPA believed a particular raw waste matrix best represented the waste code in question. In reviewing the HWTC study information, EPA reexamined those exceptions where the detection limit fell significantly below HWTC's reported detection limits and where there was anomolously high or low recoveries.

EPA had also published a report entitled "USEPA Method Study 36: SW-846 Methods 8270/3510 GC/MS Method for Semivolatile Organics: Capillary Column Technique; Separatory Funnel Liquid-Liquid Extraction," EPA/600/S4-89/010. This study documents analytical problems with several analytes for which Third Thirds standards were proposed. These analytes also were noted as problems in the HWTC study. HWTC also presented the results of this study in their comment.

COMMENT NUMBER: 33-A-2 (continued)
DOCKET NUMBER: LD12-00110
COMMENTER: ThermalKEM/CyanoKEM
ISSUE: 33-K086
SUBISSUE: Treatment Standards
RESPONSE:

As noted earlier, The HWTC comment also included calculations of treatment standards based on PQLs. In the HWTC comment, PQLs were defined as five times the method detection limit. HWTC's methodology to calculate treatment standards is the PQL times the accuracy-correction factor (as calculated from the average recovery values) times the variability factor. EPA has published its methodology to calculate treatment standards as the detection limit or concentration level (if detected) times the accuracy correction factor times the variability factor. This methodology was published as part of the First and Second Thirds Final Rules. The Agency did not receive any substantial comments concerning the methodology used to calculate the treatment standards.

In addition, EPA used the definitions for method detection limit and practical quantification limits as published in the proposed revisions to the September 1986 edition of Test Methods for Evaluating Solid Waste (also referred to as SW-846). In this document the Agency defined method detection limit as "the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. Practical quantification limits (PQLs) are defined as "the lowest level of qualification that the Agency believes a competent laboratory can be expected to reliably achieve."

The PQLs published in SW-846 were established to provide a guidance for the analysis of waste samples by acting as minimum performance criteria. Thus, PQLs do not necessarily represent the lowest limits of

COMMENT NUMBER: 33-A-2 (continued)
DOCKET NUMBER: LD12-00110
COMMENTER: ThermalKEM/CyanoKEM
ISSUE: 33-K086
SUBISSUE: Treatment Standards
RESPONSE:

analytical performance achievable for any given waste. Detection limits are the lowest limit that can be quantified for a given constituent in a given waste.

The PQLs in SW-846 were not developed for a specific waste matrix. PQLs are presented for groundwater and low-level soil. Correction factors are given for other matrices such as high level soil and non-water miscible waste. Correction factors for treatment residuals such as incinerator ash are not given. Detection limits and PQLs are directly related to the constituent of interest and to the amount of interferences that are present in different waste matrices, therefore, detection limits and PQLs are generally significantly lower for treatment residuals than for untreated waste.

In some cases detection limits and PQLs by their definition in SW-846 can be equal since detection limits are the lowest level that can be quantified for a constituent and PQLs are defined as the lowest level that can be achieved reliably. PQLs are not defined as a factor or multiple of the detection limit. Therefore, data can be reported below the PQL level. Data should not be reported below the detection limit achieved for the specific constituent for a specific matrix. If PQLs were presented for data submitted for this rule, as a factor of the detection limit, then the detection limit information was used to assess the data.

COMMENT NUMBER: . 33-A-2 (continued)
DOCKET NUMBER: LD12-00110
COMMENTER: ThermalKEM/CyanoKEM
ISSUE: 33-K086
SUBISSUE: Treatment Standards
RESPONSE:

The standards promulgated in the Third Third final rule are derived from detection limits achieved from studies of specific "F" or "K" waste or from the incineration of chemicals listed for specific "U" or "P" wastes or of a similar waste when the treatment standards are transferred. Since the detection limits used to derive the standards are based on the detection limits achieved by the laboratory that analyzed the sample, the Agency believes that other laboratories can achieve the same detection limits. In cases where more than one set of data were used to develop the treatment standard, the highest detection limit was usually selected as the basis for the treatment standard. Therefore, the resulting treatment standards reflect the best level of analytical performance that is achievable for the waste.

The Agency does not plan to change its methodology for calculating treatment standards. As a result, only information on detection limits and recovery values were evaluated and used to assess the proposed standards. The Agency did not use any information presented in the HWTC study concerning practical quantification limits to recalculate the standards to be promulgated for the U and P waste codes and for multi-source leachate nonwastewaters.

Based on all the information evaluated from the HWTC study, EPA's Method 36 Study, and EPA's 14 incineration test burns, the following nonwastewater standards for K086 have been changed.

COMMENT NUMBER: 33-A-2 (continued)
DOCKET NUMBER: LD12-00110
COMMENTER: ThermalKEM/CyanoKEM
ISSUE: 33-K086
SUBISSUE: Treatment Standards
RESPONSE:

Constituent	Treatment standard for nonwastewaters
Acetophenone	9.7 mg/kg
Acetone	160 mg/kg
Ethyl acetate	33 mg/kg
Methanol	method of treatment - incineration
Methylene Chloride	33 mg/kg
1,1,1-Trichloroethane	5.6 mg/kg
Xylene (total)	28 mg/kg
Cyclohexanone	method of treatment - incineration
Napthalene	3.1 mg/kg
Methyl ethyl ketone	36 mg/kg
Ethyl benzene	6 mg/kg
Butyl benzl phthalate	7.9 mg/kg
Toluene	28 mg/kg

The proposed regulations for the remaining constituents (n-butyl alcohol, ethyl benzene, methyl ethyl ketone, methyl isobutyl ketone, trichloroethylene, bis(2-ethyl hexyl)phthalate, butyl benzyl phthalate, cyclohexanone, 1,2-dichlorobenzene, diethyl phthalate, dimethyl phthalate di-n-butyl phthalate, di-n-octyl phthalate, and nitrobenzene) will be promulgated without change.

Comment Number: 33-A-3
Docket Number: LD12-00172
Commenter: Hazardous Waste Treatment Council
Issue: 33- K086
Subissue: Treatment Standards
Comment:

The BDAT standards for 11 constituents in the K086 should be revised for the final rule constituent with the results of the HWTC Interlaboratory study on PQLs for incinerator ash. The following are the standards in need of revision for the final rule.

Constituent	Revised BDAT Std. Based On PQL, Nonwastewater, mg/kg
Acetone	105
Acetophenone	92
Bis(2-ethylhexyl) phthalate	79
n-butyl alcohol	N/A*
Cyclohexanone	116
1,2-dichlorobenzene	13.9
Ethyl acetate	34.9
Methanol	N/A*
Methylene Chloride	N/A*
Naphthalene	9.5
Nitrobenzene	81

* Not analyzable, delete standard (*see* discussion in PQL report)

Comment Number: 33-A-3
Docket Number: LD12-00172
Commenter: HAZARDOUS WASTE TREATMENT COUNCIL
Issue: 33-K086
Subissue: Treatment Standards
Response:

Response to HWTC Comment:

The Hazardous Waste Treatment Council (HWTC) proposed revisions to several of the U and P waste code nonwastewater standards, and therefore, to the K086 waste code nonwastewater treatment standards which for the constituents to be regulated are the same as their U and P counterparts.

The Agency has used the method detection limit study submitted by HWTC to the Agency during the comment period for the Land Disposal Restrictions Rule for Third Third Scheduled Wastes to evaluate whether industry's laboratories can reliably quantify regulated constituents at the level of both the proposed and previously promulgated concentration-based standards established for U and P waste codes. These concentration-based standards are based on incineration ash data from 14 incineration studies conducted by the Agency specifically for the Land Disposal Restrictions Program.

The intent of HWTC's study was to verify whether industry's laboratories could routinely quantify the constituents regulated for U and P waste codes and to identify the constituents which could not be quantified at the proposed or promulgated concentration-based standards. The HWTC study consisted of spiking the regulated constituents in samples of incineration ash at levels near the concentration-based standards and analyzing the samples using SW-846 methods, specifically the micro extraction technique for volatile organics followed by Method 8240 and soxhlet extraction for the semi-volatile organics followed by

Comment Number: 33-A-3 (continued)
Docket Number: LD12-00172
Commenter: HAZARDOUS WASTE TREATMENT COUNCIL
Issue: 33-K086
Subissue: Treatment Standards
Response:

Method 8270. The study was conducted at six laboratories. Each laboratory analyzed seven replicates to determine the method detection limit and seven spiked samples to determine the recovery values for each constituent. The study included information on method detection limits and recovery values.

HWTC calculated treatment standards using their methodology, which is based on practical quantification levels (PQLs) for each constituent. HWTC defined PQLs as a value five times the method detection limit.

HWTC's methodology to calculate treatment standards is the PQL times the accuracy-correction factor (as calculated from the average recovery values) times the variability factor. EPA has published its methodology to calculate treatment standards as the detection limit or concentration level (if detected) times the accuracy correction factor times the variability factor. This methodology was published as part of the First and Second Thirds Final Rules. The Agency did not receive any substantial comments concerning the methodology used to calculate the treatment standards.

In addition, EPA used the definitions for method detection limit and practical quantification limits as published in the proposed revisions to the September 1986 edition of Test Methods for Evaluating Solid Waste (also referred to as SW-846). In this document the Agency defined method detection limit as "the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte

Comment Number: 33-A-3 (continued)
Docket Number: LD12-00172
Commenter: HAZARDOUS WASTE TREATMENT COUNCIL
Issue: 33-K086
Subissue: Treatment Standards
Response:

concentration is greater than zero. Practical quantification limits (PQLs) are defined as "the lowest level of qualification that the Agency believes a competent laboratory can be expected to reliably achieve."

The PQLs published in SW-846 were established to provide a guidance for the analysis of waste samples by acting as minimum performance criteria. Thus, PQLs do not necessarily represent the lowest limits of analytical performance achievable for any given waste. EPA reiterates that PQLs are minimum measures of analytical laboratory performance, as defined in SW-846 for the use of laboratories in assessing their own performance in terms of success in reaching low levels of certain analytes in certain matrices. Outside of this function of providing a quantitative definition of the boundaries between poor and competent analytical performance, PQLs have no regulatory power. Detection limits are the lowest limit that can be quantified for a given constituent in a given waste.

The PQLs in SW-846 were not developed for a specific waste matrix. PQLs are presented for groundwater and low-level soil. Correction factors are given for other matrices such as high level soil and non-water miscible waste. Correction factors for treatment residuals such as incinerator ash are not given. Detection limits and PQLs are directly related to the constituent of interest and to the amount of interferences that are present in different waste matrices, therefore, detection limits and PQLs are generally significantly lower for treatment residuals than for untreated waste.

Comment Number: 33-A-3 (continued)
Docket Number: LD12-00172
Commenter: HAZARDOUS WASTE TREATMENT COUNCIL
Issue: 33-K086
Subissue: Treatment Standards
Response:

In some cases detection limits and PQLs by their definition in SW-846 can be equal since detection limits are the lowest level that can be quantified for a constituent and PQLs are defined as the lowest level that can be achieved reliably. PQLs are not defined as a factor or multiple of the detection limit. Therefore, data can be reported below the PQL level. Data should not be reported below the detection limit achieved for the specific constituent for a specific matrix. If PQLs were presented for data submitted for this rule, as a factor of the detection limit, then the detection limit information was used to assess the data.

The standards promulgated in the Third Third final rule are derived from detection limits achieved from studies of specific "F" or "K" waste or from the incineration of chemicals listed for specific "U" or "P" wastes or of a similar waste when the treatment standards are transferred. Since the detection limits used to derive the standards are based on the detection limits achieved by the laboratory that analyzed the sample, the Agency believes that other laboratories can achieve the same detection limits. In cases where more than one set of data were used to develop the treatment standard, the highest detection limit was usually selected as the basis for the treatment standard. Therefore, the resulting treatment standards reflect the best level of analytical performance that is achievable for the waste.

The Agency does not plan to change its methodology for calculating treatment standards. As a result, only information on detection limits and recovery values were evaluated and used to assess the proposed

Comment Number: 33-A-3 (continued)
Docket Number: LD12-00172
Commenter: HAZARDOUS WASTE TREATMENT COUNCIL
Issue: 33-K086
Subissue: Treatment Standards
Response:

standards. The Agency did not use any information presented in the HWTC study concerning practical quantification limits to recalculate the standards to be promulgated for the U and P waste codes and for multi-source leachate nonwastewaters.

EPA used the HWTC study to reevaluate the standards that were proposed in the Third Thirds Rule for U and P nonwastewaters and multi-source leachate nonwastewaters. Several sets of changes occurred primarily when EPA reevaluated cases where the HWTC study reported higher detection limits than those used by EPA to calculate standards. Although EPA had generally used the highest of the set of up to 14 incineration ash detection limits as the basis of the proposed standards, some exceptions were made in the case of outliers and where EPA believed a particular raw waste matrix best represented the waste code in question. In reviewing the HWTC study information, EPA reexamined those exceptions where the detection limit fell significantly below HWTC's reported detection limits.

Based on HWTC's study and their methodology for calculating treatment standards, the commenter proposed that the treatment standards for K086 nonwastewaters for the following constituents should be revised: acetone, acetophenone, bis(2-ethyl hexyl)phthalate, n-butyl alcohol, cyclohexanone, 1,2-dichlorobenzene, ethyl acetate, methanol, methylene chloride, naphthalene, and nitrobenzene.

Comment Number: 33-A-3 (continued)
Docket Number: LD12-00172
Commenter: HAZARDOUS WASTE TREATMENT COUNCIL
Issue: 33-K086
Subissue: Treatment Standards
Response:

Based on the reevaluation of the data for the 14 incineration test burns and the HWTC study, the nonwastewater treatment standards for some constituents were changed. The treatment standards were calculated using EPA's data and EPA's methodology for calculation of treatment standards.

Due to limited data and analytical problems, the Agency will promulgate treatment methods for the nonwastewaters for cyclohexanone and methanol. The treatment method will be incineration.

For acetone, EPA reevaluated its own data and had a range of detection limits of 0.05 to 50 mg/kg. During the proposed rule, the nonwastewater treatment standard was based on the incineration of K011, K013, and K014, because of this waste had the highest concentration of acetone in the untreated waste. However, the nonwastewater matrixes for U002 and multi-source leachate, and K086 may be more difficult to treat and analyze than K011, K013, and K014 wastes, which primarily contain volatile organics. Therefore, the Agency has decided to select the highest detection limit from the 14 incineration test burns and its associated recovery value to calculate the standard. This revised nonwastewater treatment standard is 160 mg/kg.

For acetophenone, HWTC had detection limits that were 1.4 to 8.6 mg/kg for five laboratories and 15.9 mg/kg for one laboratory. The detection limits for EPA's data ranged from 0.19 to 2.0 mg/kg. Therefore, EPA believes that laboratories can analyze this constituent at levels below the revised nonwastewater treatment standard of 9.7 mg/kg.

Comment Number: 33-A-3 (continued)
Docket Number: LD12-00172
Commenter: HAZARDOUS WASTE TREATMENT COUNCIL
Issue: 33-K086
Subissue: Treatment Standards
Response:

(This standard was revised when EPA reevaluated the recovery factor used to calculate the standard. The proposed standard was based on an average recovery factor from several of the spiked constituents, whereas, the revised standard is based on the recovery factor from a single constituent.)

For ethyl acetate, HWTC had detection limits that were greater than the proposed standard. EPA reevaluated its data and determined that the range of detection limits was 0.02 to 10 and HWTC's detection limits ranged from 2.3 to 7.5. As a result, EPA reevaluated the data used to transfer the standard and determined that the data from K001 with a detection limit of 10 would be a more appropriate matrix to transfer the data than from K024. The revised nonwastewater treatment standard is 33 mg/kg.

For methylene chloride, HWTC stated that this constituent it is a common laboratory contaminant resulting in high background concentrations which is not possible to correct consistently in blanks. HWTC also believes that the recoveries for methylene chloride are inconsistent and a concentration-based treatment standard should not be set. The Agency agrees that methylene chloride is a common laboratory contaminant at very low levels. The Agency believes that good laboratory practices can reduce the presence of methylene chloride to a few parts per billion in the blank. The Agency has also reviewed its own data for the 14 incineration burns and believes that a laboratory can achieve good recovery for this constituent. Therefore, the Agency will promulgate a

Comment Number: 33-A-3 (continued)
Docket Number: LD12-00172
Commenter: HAZARDOUS WASTE TREATMENT COUNCIL
Issue: 33-K086
Subissue: Treatment Standards
Response:

concentration-based standard of 33 mg/kg. (This standard was revised when EPA reevaluated the recovery factor used to calculate the standard. The proposed standard was based on an average recovery factor from several of the spiked constituents, whereas, the revised standard is based on the recovery factor from a single constituent.)

For naphthalene, EPA reevaluated its data. The detection limits ranged from 0.11 to 2 mg/kg. HWTC's detection limits ranged from 0.18 to 0.34 for five laboratories and was 5.7 for one laboratory. Based on these data, the Agency believes that detection limits below 3 mg/kg are achievable. Therefore, the Agency will promulgate a standard of 3.1 mg/kg for this constituent based on the data from the incineration of K019.

For bis(2-ethyl hexyl) phthalate, n-butyl alcohol, 1,2-dichlorobenzene, and nitrobenzene, the Agency will promulgate the proposed standards. EPA reevaluated the data used to calculate the nonwastewater treatment standards, however, the HWTC method detection limit data shows that these constituents are analyzable at the levels proposed for the concentration-based standards. EPA will promulgate these nonwastewater standards without change. Following is a summary of the detection limit data for these constituents.

Comment Number: 33-A-3 (continued)
Docket Number: LD12-00172
Commenter: HAZARDOUS WASTE TREATMENT COUNCIL
Issue: 33-K086
Subissue: Treatment Standards
Response:

Constituent	Proposed	Range of Detection Limits From HWTC Study (mg/kg)	Range of Detection Limits for EPA's 14 Incineration Burns (mg/kg)
Bis(2-ethyl hexyl) phthalate	28	2.6 - 17.4	Based on promulgated standard for U028
n-Butyl alcohol	2.6	No data supplied by HWTC	0.4
1,2-Dichlorobenzene	6.2	0.3-2.7 for the 6 laboratories	0.13-2.00
Nitrobenzene	14	1.2-5 for 5 of 6 laboratories; 18.7 for one laboratory.	0.13-5

Comment Number: 33-A-4
Docket Number: LD12-00172
Commenter: Hazardous Waste Treatment Council
Issue: 33-K086
Subissue: Treatment Standards
Comment:

The HWTC supports the proposed revisions to the treatment standards for K086 wastes. These standards for most of the constituents are more representative of actual K086 waste streams.

The other 13 constituents proposed for K086 are set such that PQLs are below BDAT standards. The HWTC therefore agrees with the proposed standards for those constituents.

Comment Number: 33-A-4
Docket Number: LD12-00172
Commenter: HAZARDOUS WASTE TREATMENT COUNCIL
Issue: 33-K086
Subissue: Treatment Standards
Response:

The Hazardous Waste Treatment Council (HWTC) proposed revisions to several of the U and P waste code nonwastewater standards and, therefore, to the K086 waste code nonwastewater treatment standards, which are the same as the U and P counterparts for the constituents to be regulated.

The Agency has used the method detection limit study submitted by HWTC to the Agency during the comment period for the Land Disposal Restrictions Rule for Third Third Scheduled Wastes to evaluate whether industry's laboratories can reliably quantify regulated constituents at the level of both the proposed and previously promulgated concentration-based standards established for U and P waste codes. These concentration-based standards are based on incineration ash data from 14 incineration studies conducted by the Agency specifically for the Land Disposal Restrictions Program.

The intent of HWTC's study was to verify whether industry's laboratories could routinely quantify the constituents regulated for U and P waste codes and to identify the constituents which could not be quantified at the proposed or promulgated concentration-based standards. The HWTC study consisted of spiking the regulated constituents in samples of incineration ash at levels near the concentration-based standards and analyzing the samples using SW-846 methods, specifically the micro extraction technique for volatile organics followed by Method 8240 and soxhlet extraction for the semi-volatile organics followed by Method 8270. The study was conducted at six laboratories. Each laboratory analyzed seven replicates to determine the method detection limit and

Comment Number: 33-A-4 (continued)
Docket Number: LD12-00172
Commenter: HAZARDOUS WASTE TREATMENT COUNCIL
Issue: 33-K086
Subissue: Treatment Standards
Response:

seven spiked samples to determine the recovery values for each constituent. The study included information on method detection limits and recovery values.

HWTC calculated treatment standards using their methodology, which is based on practical quantification levels (PQLs) for each constituent. HWTC defined PQLs as a value five times the method detection limit.

HWTC's methodology to calculate treatment standards is the PQL times the accuracy-correction factor (as calculated from the average recovery values) times the variability factor. EPA has published its methodology to calculate treatment standards as the detection limit or concentration level (if detected) times the accuracy correction factor times the variability factor. This methodology was published as part of the First and Second Thirds Final Rules. The Agency did not receive any substantial comments concerning the methodology used to calculate the treatment standards.

In addition, EPA used the definitions for method detection limit and practical quantification limits as published in the proposed revisions to the September 1986 edition of Test Methods for Evaluating Solid Waste (also referred to as SW-846). In this document the Agency defined method detection limit as "the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. Practical quantification limits (PQLs) are defined as "the lowest level of qualification that the Agency believes a competent laboratory can be expected to reliably achieve."

Comment Number: 33-A-4 (continued)
Docket Number: LD12-00172
Commenter: HAZARDOUS WASTE TREATMENT COUNCIL
Issue: 33-K086
Subissue: Treatment Standards
Response:

The PQLs published in SW-846 were established to provide a guidance for the analysis of waste samples by acting as minimum performance criteria. Thus, PQLs do not necessarily represent the lowest limits of analytical performance achievable for any given waste. EPA reiterates that PQLs are minimum measures of analytical laboratory performance, as defined in SW-846 for the use of laboratories in assessing their own performance in terms of success in reaching low levels of certain analytes in certain matrices. Outside of this function of providing a quantitative definition of the boundaries between poor and competent analytical performance, PQLs have no regulatory power. Detection limits are the lowest limit that can be quantified for a given constituent in a given waste.

The PQLs in SW-846 were not developed for a specific waste matrix. PQLs are presented for groundwater and low-level soil. Correction factors are given for other matrices such as high level soil and non-water miscible waste. Correction factors for treatment residuals such as incinerator ash are not given. Detection limits and PQLs are directly related to the constituent of interest and to the amount of interferences that are present in different waste matrices, therefore, detection limits and PQLs are generally significantly lower for treatment residuals than for untreated waste.

In some cases detection limits and PQLs by their definition in SW-846 can be equal since detection limits are the lowest level that can be quantified for a constituent and PQLs are defined as the lowest level

Comment Number: 33-A-4 (continued)
Docket Number: LD12-00172
Commenter: HAZARDOUS WASTE TREATMENT COUNCIL
Issue: 33-K086
Subissue: Treatment Standards
Response:

that can be achieved reliably. PQLs are not defined as a factor or multiple of the detection limit. Therefore, data can be reported below the PQL level. Data should not be reported below the detection limit achieved for the specific constituent for a specific matrix. If PQLs were presented for data submitted for this rule, as a factor of the detection limit, then the detection limit information was used to assess the data.

The standards promulgated in the Third Third final rule are derived from detection limits achieved from studies of specific "F" or "K" waste or from the incineration of chemicals listed for specific "U" or "P" wastes or of a similar waste when the treatment standards are transferred. Since the detection limits used to derive the standards are based on the detection limits achieved by the laboratory that analyzed the sample, the Agency believes that other laboratories can achieve the same detection limits. In cases where more than one set of data were used to develop the treatment standard, the highest detection limit was usually selected as the basis for the treatment standard. Therefore, the resulting treatment standards reflect the best level of analytical performance that is achievable for the waste.

The Agency does not plan to change its methodology for calculating treatment standards. As a result, only information on detection limits and recovery values were evaluated and used to assess the proposed standards. The Agency did not use any information presented in the HWTC study concerning practical quantification limits to recalculate the

Comment Number: 33-A-4 (continued)
Docket Number: LD12-00172
Commenter: HAZARDOUS WASTE TREATMENT COUNCIL
Issue: 33-K086
Subissue: Treatment Standards
Response:

standards to be promulgated for the U and P waste codes and for multi-source leachate nonwastewaters.

EPA used the HWTC study to reevaluate the standards that were proposed in the Third Thirds Rule for U and P nonwastewaters and multi-source leachate nonwastewaters. Several sets of changes occurred primarily when EPA reevaluated cases where the HWTC study reported higher detection limits than those used by EPA to calculate standards. Although EPA had generally used the highest of the set of up to 14 incineration ash detection limits as the basis of the proposed standards, some exceptions were made in the case of outliers and where EPA believed a particular raw waste matrix best represented the waste code in question. In reviewing the HWTC study information, EPA reexamined those exceptions where the detection limit fell significantly below HWTC's reported detection limits.

Based on HWTC's study and their methodology for calculating treatment standards, the commenter proposed that the treatment standards for K086 nonwastewaters for the following constituents should be revised: acetone, acetophenone, bis(2-ethyl hexyl)phthalate, n-butyl alcohol, cyclohexanone, 1,2-dichlorobenzene, ethyl acetate, methanol, methylene chloride, naphthalene, and nitrobenzene.

Based on the reevaluation of the data for the 14 incineration test burns and the HWTC study, the nonwastewater treatment standards for some constituents were changed. The treatment standards were calculated using EPA's data and EPA's methodology for calculation of treatment standards.

Comment Number: 33-A-4 (continued)
Docket Number: LD12-00172
Commenter: HAZARDOUS WASTE TREATMENT COUNCIL
Issue: 33-K086
Subissue: Treatment Standards
Response:

Due to limited data and analytical problems, the Agency will promulgate treatment methods for the nonwastewaters for cyclohexanone and methanol. The treatment method will be incineration.

For acetone, EPA reevaluated its own data and had a range of detection limits of 0.05 to 50 mg/kg. During the proposed rule, the nonwastewater treatment standard was based on the incineration of K011, K013, and K014, because of this waste had the highest concentration of acetone in the untreated waste. However, the nonwastewater matrixes for U002 and multi-source leachate, and K086 may be more difficult to treat and analyze than K011, K013, and K014 wastes, which primarily contain volatile organics. Therefore, the Agency has decided to select the highest detection limit from the 14 incineration test burns and its associated recovery value to calculate the standard. This revised nonwastewater treatment standard is 160 mg/kg.

For ethyl acetate, HWTC had detection limits that were greater than the proposed standard. EPA reevaluated its data and determined that the range of detection limits was 0.02 to 10 and HWTC's detection limits ranged from 2.3 to 7.5. As a result, EPA reevaluated the data used to transfer the standard and determined that the data from K001 with a detection limit of 10 would be a more appropriate matrix to transfer the data than from K024. The revised nonwastewater treatment standard is 33 mg/kg.

Comment Number: 33-A-4 (continued)

Docket Number: LD12-00172

Commenter: HAZARDOUS WASTE TREATMENT COUNCIL

Issue: 33-K086

Subissue: Treatment Standards

Response:

For acetophenone, HWTC had detection limits that were 1.4 to 8.6 mg/kg for five laboratories and 15.9 for one laboratory. The detection limits for EPA's data ranged from 0.19 to 2.0 mg/kg. Therefore, EPA believes that laboratories can analyze this constituent at levels below the revised nonwastewater treatment standard of 9.7 mg/kg. (This standard was revised when EPA reevaluated the recovery factor used to calculate the standard. The proposed standard was based on an average recovery factor from sevral of the spiked constituents, whereas, the revised standard is based on the recovery factor from a single constituent.)

For methylene chloride, HWTC stated that this constituent it is a common laboratory contaminant resulting in high background concentrations which is not possible to correct consistently in blanks. HWTC also believes that the recoveries for methylene chloride are inconsistent and a concentration-based treatment standard should not be set. The Agency agrees that methylene chloride is a common laboratory contaminant at very low levels. The Agency believes that good laboratory practices can reduce the presence of methylene chloride to a few parts per billion in the blank. The Agency has also reviewed its own data for the 14 incineration burns and believes that a laboratory can achieve good recovery for this constituent. Therefore, the Agency will promulgate a concentration-based standard of 33 mg/kg. (This standard was revised when EPA reevaluated the recovery factor used to calculate the standard. The proposed standard was based on average recovery factors from several of the spiked constituents, whereas, the revised standard is based on the recovery factor from a single constituent.)

Comment Number: 33-A-4 (continued)
Docket Number: LD12-00172
Commenter: HAZARDOUS WASTE TREATMENT COUNCIL
Issue: 33-K086
Subissue: Treatment Standards
Response:

For naphthalene, EPA reevaluated its data. The detection limits ranged from 0.11 to 2mg/kg. HWTC's detection limits ranged from 0.18 to 0.34 for five laboratories and was 5.7 for one laboratory. Based on these data, the Agency believes that detection limits below 3 mg/kg are achievable. Therefore, the Agency will promulgate a standard of 3.1 mg/kg for this constituent based on the data from the incineration of K019.

For bis(2-ethyl hexyl) phthalate, n-butyl alcohol, 1,2-dichlorobenzene, and nitrobenzene, the Agency will promulgate the proposed standards. EPA reevaluated the data used to calculate the nonwastewater treatment standards, however, the HWTC method detection limit data shows that these constituents are analyzable at the levels proposed for the concentration-based standards. EPA will promulgate these nonwastewater standards without change. Following is a summary of the detection limit data for these constituents.

The Agency acknowledges the Hazardous Waste Treatment Council's (HWTC) support of the proposed standards for the following seven constituents.

Methyl isobutyl ketone
Toluene
Trichloroethylene
Diethyl phthalate
Dimethyl phthalate
Di-n-butyl phthalate
Di-n-octyl phthalate
Cyanide

Comment Number: 33-A-4 (continued)
Docket Number: LD12-00172
Commenter: HAZARDOUS WASTE TREATMENT COUNCIL
Issue: 33-K086
Subissue: Treatment Standards
Response:

Constituent	Proposed	Range of Detection Limits From HWTC Study (mg/kg)	Range of Detection Limits for EPA's 14 Incineration Burns (mg/kg)
Bis(2-ethyl hexyl) phthalate	28	2.6 - 17.4	Based on promulgated standard for U028
n-Butyl alcohol	2.6	No data supplied by HWTC	0.4
1,2-Dichlorobenzene	6.2	0.3-2.7 for the 6 laboratories	0.13-2.00
Nitrobenzene	14	1.2-5 for 5 of 6 laboratories; 18.7 for one laboratory.	0.13-5

The nonwastewater treatment standards proposed for the constituents will be promulgated without change.

The HWTC supported the proposed standards for the following constituents; however, based on a review of the method detection limit study submitted by HWTC and EPA's reevaluation data for the 14 incineration test burns, the standards for the following five constituents were changed:

Comment Number: 33-A-4 (continued)
Docket Number: LD12-00172
Commenter: HAZARDOUS WASTE TREATMENT COUNCIL
Issue: 33-K086
Subissue: Treatment Standards
Response:

Constituent	Proposed standard (mg/kg)	Revised standard (mg/kg)
1,1,1-Trichloroethane	6.2	5.6
Xylene	33	28
Methyl ethyl ketone	200	36
Ethyl benzene	33	6
Butyl benzl phthalate	28	7.9

Although the revised standards are lower, the detection limit data supplied by HWTC indicated that laboratories should be able to achieve these standards. The range of detection limits available from HWTC for the six laboratories that participated in the method detection limit study are:

Constituent	Range of Detection Limit from HWTC Study (mg/kg)
1,1,1-trichloroethane	0.6 - 1.5
Xylene	0.06 - 1.3
Methyl ethyl ketone	4.5 - 21.3
Ethyl benzene	0.04 - 0.13
Butyl benzl phthalate	0.6 - 4.5
Toluene	0.12 - 3.67

Comment Number: 33-13-1
Docket Number: LD12-00110
Commenter: ThermalKem / CyaniKem
Issue: 33- K086
Subissue: Subcategories
Comment:

K086 WASTES

Also, we concur with EPA that it is unnecessary to subcategorize this code beyond wastewaters and non-wastewaters groupings.

Comment Number: 33-B-1

Docket Number: LD12-00110

Commenter: THERMALKEM/CYANOKEM

Issue: 33-K086

Subissue: Subcategories

Response:

EPA acknowledges the support for not subcategorizing K086 beyond wastewaters and nonwastewaters. EPA is incorporating this approach in its final rule.

Comment Number: 33-B-2
Docket Number: LD12-00172
Commenter: Hazardous Waste Treatment Council
Issue: 33-K086
Subissue: Subcategories
Comment:

K086

Also, the HWTC concurs with EPA that it is unnecessary to subcategorize this code beyond wastewaters and nonwastewaters groupings.

Comment Number: 33-B-2

Docket Number: LD12-00172

Commenter: HAZARDOUS WASTE TREATMENT COUNCIL

Issue: 33-K086

Subissue: Subcategories

Response:

EPA acknowledges the support for not subcategorizing K086 beyond wastewaters and nonwastewaters. EPA is incorporating this approach in its final rule.

Comment Number: 33-C-1

Docket Number: LD12-00133A

Commenter: PPG Industries

Issue: 33-K086

Subissue: Total Chromium vs Hexavalent Chromium

Comment:

1. EPA Should Use Hexavalent Chromium instead of Total Chromium as a BDAT Constituent for K086.

With respect to the treatment standard, PPG objects to EPA's selection of total chromium as a BDAT constituent. K086 is considered hazardous because it contains hexavalent chromium. (See, 40 CFR Part 261, Appendix VII). Thus, the effectiveness of any treatment technology for K086 should be measured in terms of how it reduces the amount of hexavalent, rather than total, chromium that can migrate into the environment. PPG therefore suggests that hexavalent chromium be listed in lieu of total chromium in the BDAT standard.

Comment Number: 33-C-1
Docket Number: LD12-00133A
Commenter: PPG INDUSTRIES
Issue: 33-K086
Subissue: Total Chromium vs. Hexavalent Chromium
Response:

EPA is promulgating treatment standards for chromium (total) based on the treatment of wastes believed to be as difficult to treat as K086 wastes. These standards are based on the wastewater treatment residues resulting from the hexavalent chromium reduction to trivalent chromium followed by excess lime precipitation and filtration of a wastewater believed similar to K086 wastewaters. Also, there are certain analytical problems in testing for hexavalent chromium. When analytical problems arise, the Agency must promulgate a method of treatment as the treatment standard. The Agency prefers to promulgate concentration-based standards. Therefore, the treatment standard is based on analysis of total chromium.

The Agency is not persuaded by arguments contending that "EPA has recognized that only the hexavalent chromium presents a threat to humans and the environment ..." and is maintaining that treatment of total chromium will provide the most effective regulation of hexavalent forms. This comment improperly characterizes the Agency's position. Under Subtitle C, EPA regulates on a total chromium basis unless it is demonstrated that chromium is exclusively (or nearly exclusively) trivalent, the chromium is generated from a process that uses only trivalent chromium, and that the waste is managed in a non-oxidizing environment, see 261.4(b)(6)(i) 1980. To date, EPA is unaware of any generator submitting a demonstration of this type to EPA for processing. EPA is not reopening this long-settled issue in this proceeding.

Comment Number: 33-D-1
Docket Number: LD12-00133A
Commenter: PPG Industries
Issue: 33 - K086
Subissue: Mixture and Derived-from Rule
Comment:

2. EPA Should Reconsider How the Mixture and Derived - From Rules Apply to Multi-Waste Treatment Residues Containing K086.

PPG is also concerned about the effect of EPA's proposal for K086 by virtue of the mixture rule and the derived-from rule. PPG operates a hazardous waste incinerator in Circleville, Ohio which is permitted to incinerate a wide variety of wastes including K086. K086 represents a very small percentage of the total waste feed to the incinerator. Yet by virtue of the mixture/derived-from rules the ash must meet the BDAT standard for K086. It is likely that the standard will be not be met, since existing data shows the proposed standard is exceeded when no K086 is being incinerated. Thus, the inability to achieve BDAT will be due to other wastes in the mix. This obviously means PPG also will be unable to meet the BDAT standard on those occasions when K086 is part of the waste feed. However, PPG will be unable to qualify for a variance from the treatment standard because it will not be able to meet EPA's criteria for a variance, i.e., PPG cannot show that its K086 is significantly different from the waste evaluated by EPA.

PPG suggests that EPA modify how the mixture and derived-from rules would apply to mixed residue from a variety of wastes. For example, some type of "netting out" should be permitted for portions of constituents which are derived from the treatment of wastes not subject to the BDAT standard.

Comment Number: 33-D-1
Docket Number: LD12-00133A
Commenter: PPG INDUSTRIES
Issue: 33-K086
Subissue: Mixture and Derived-from Rule
Response:

The commenter's statements concern the development of treatment standards applicable to K086 and it does not concern revisions of EPA positions on the "mixture and derived from rule" policies. However, the Agency believes today's standards fully take into account the commenter's concerns because today's standards rely on performance data that represent the treatment of various organic hazardous wastes believed to be similar to K086 wastes. In fact, EPA has also adopted the BDAT methodology for U and P hazardous constituents that are also regulated constituents in K086 wastes. This is because available data for the generation and characterization of K086 wastes show that organic constituents in U and P as well as K086 wastes are likely to show similar treatment characteristics. Also, these wastes are routinely treated by the same BDAT.

Comment Number: 33-E-1
Docket Number: LD12-00133A
Commenter: PPG Industries
Issue: 33 - K086
Subissue: Soft Hammer
Comment:

3. EPA Should Adopt a Means to Prevent Soft Hammer Consequences K086 Soft Hammer Subcategories Comprise a Small Portion of a Mixed Waste Feed to an Incinerator.

For reasons similar to those described in section C.2 of these comments, PPG is concerned about EPA's decision to soft-hammer two subcategories of K086 wastes. This means that residue derived from the incineration of waste mixes including a small percentage of these soft-hammer wastes must be sent to units that meet EPA's minimum technological requirements (MTR units). PPG expects that such wastes will be incinerated at its facility on an irregular basis as part of a multi-waste feed. This means that PPG will be required to somehow segregate wastes derived from treatment of waste mixes containing soft hammer wastes so they can be shipped to MTR units. Apart from the practical problems this presents, PPG can see little environmental benefit to such management where these soft hammer wastes have been treated by incineration. In addition, this means limited MTR capacity would have to be used for mixed waste residue containing only a small portion of residue derived from the treatment of soft-hammer wastes.

For these reasons, PPG suggests that EPA consider some mechanism that would prevent the soft-hammer consequences from applying to such mixed residues when the soft-hammered waste is receiving significant treatment.

Comment Number: 33-E-1
Docket Number: LD12-00133A
Commenter: PPG INDUSTRIES
Issue: 33-K086
Subissue: Soft Hammer
Response:

The commenter appears confused about the applicability of the "soft hammer" provisions after final K086 treatment standards are promulgated on May 8, 1990. While it is true that two subcategories of K086 (i.e., K086 caustic and wastewater) have been subject to "soft hammer" requirements until May 8, 1990 that required that land disposal occur in MTR units, following May 8, 1990, the "soft hammer" provisions no longer apply. This means that continued land disposal of untreated K086 in MTR units is prohibited. It does not mean, however, that treated K086 (even those subcategories of K086 that have heretofore been subject to "soft hammer" provisions) must be disposed in an MTR unit. All subcategories of K086 must meet today's promulgated treatment standards prior to disposal in a Subtitle C land disposal facility.

This comment concerns the development of treatment standards applicable to K086. It does not concern revisions of EPA's positions on the "mixture and derived from rule" policies. EPA's policy positions applicable to soft hammer wastes resulting from MTR units once the K086 statutory deadline takes place can be found in the preamble to the final Third Third rule.

ISSUE CODE 34: K100 - Waste Leaching Solution from Acid Leaching of Emission Control Dust/Sludge from Secondary Lead Smelting

No Comments Were Received for this Issue

ISSUE CODE 35: Wastes Containing Cyanide

A.-. Analytical Methodology
B.-. BDAT
C.-. Treatment Standards
D.-. Soil/Debris

Comment Number: 35 - A - 1
Docket Number: L012-00122
Commenter: Deere & Company
Issue: Cyanide
Subissue: Analytical Methodology
Comment:

3. The standard for amenable cyanide should be dropped until the problems with the analytical method are corrected and the analysis can be performed reliably.

Comment Number: 35-A-1
Docket Number: LD12-00122
Commenter: Deere & Company
Issue: Cyanide
Subissue: Analytical Methodology
Response:

In today's final rule, EPA is promulgating an amendment to Method 9012 used for analyzing wastes containing cyanides.

EPA does not believe that this promulgated clarification to the analytical method affects the achievability of the cyanide standards already promulgated. In fact, the sample size and the distillation time used to develop the treatment standards for F006, F007, F008, and F009 nonwastewaters were 10 grams and 1 hour and 15 minutes, respectively (see RCRA Docket LD10-L0032, letter dated May 1, 1989). The Agency subsequently has solicited information from several treaters of cyanide wastes, who indicated to the Agency during the Second Third rulemaking that they were achieving the F006 nonwastewater cyanide standard in terms of the sample size and distillation time they were using (see administrative record for cyanide wastes in today's notice). The Agency is promulgating an amendment to Method 9012 in today's final rule. A sample size of 10 grams and a distillation time of one hour and fifteen minutes should be used in order to comply with this Third Third rulemaking. Therefore, the Agency believes that the data in the Second Third rule documenting achievability of the cyanide treatment standard reflects the analytical procedure being promulgated today.

Comment Number: 35 - A - 2

Docket Number: LD12-00114

Commenter: ICWM

Issue: Cyanides

Subissue: Analytical Methodology

Comment:

TESTING OF CYANIDE WASTES

The Agency has developed LDR standards verification based on SW-84 Analytical Method 9010. The Institute emphasizes that this method does not apply to the analysis of non-wastewaters. Therefore, the Agency needs to use a more suitable analytical method and re-define BDAT for these wastes.

Comment Number: 35-A-2
Docket Number: LD12-00164
Commenter: ICWM
Issue: Cyanides
Subissue: Analytical Methodology
Response:

In today's final rule, EPA is promulgating an amendment to Method 9010 used for analyzing wastes containing cyanides.

EPA does not believe that this promulgated clarification to the analytical method affects the achievability of the cyanide standards already promulgated. In fact, the sample size and the distillation time used to develop the treatment standards for F006, F007, F008, and F009 nonwastewaters were 10 grams and 1 hour and 15 minutes, respectively (see RCRA Docket LD10-L0032, letter dated May 1, 1989). The Agency subsequently has solicited information from several treaters of cyanide wastes, who indicated to the Agency during the Second Third rulemaking that they were achieving the F006 nonwastewater cyanide standard in terms of the sample size and distillation time they were using (see administrative record for cyanide wastes in today's notice). The Agency is promulgating an amendment to Method 9012 in today's final rule. A sample size of 10 grams and a distillation time of one hour and fifteen minutes should be used in order to comply with this Third Thirds rulemaking. Therefore, the Agency believes that the data in the Second Third rule documenting achievability of the cyanide treatment standard reflects the analytical procedure being promulgated today.

Comment Number: 35 - A - 3
Docket Number: LD12-00231
Commenter: L.E Lowry
Issue: Cyanides
Subissue: Analytical Methodology
Comment:

With regard to the applicability of Analytical Method 9010 for organic cyanides, the only comment I have is that they are excluded in the Scope of the Method, indicating that the chemistry for these compounds is entirely different.

Comment Number: 35-A-3

Docket Number: LD12-00229

Commenter: F. W. DeVries

Issue: Cyanides

Subissue: Analytical Methodology

Response:

In today's final rule, EPA is promulgating an amendment to Method 9010 used for analyzing wastes containing cyanides.

EPA does not believe that this promulgated clarification to the analytical method affects the achievability of the cyanide standards already promulgated. In fact, the sample size and the distillation time used to develop the treatment standards for F006, F007, F008, and F009 nonwastewaters were 10 grams and 1 hour and 15 minutes, respectively (see RCRA Docket LD10-L0032, letter dated May 1, 1989). The Agency subsequently has solicited information from several treaters of cyanide wastes, who indicated to the Agency during the Second Third rulemaking that they were achieving the F006 nonwastewater cyanide standard in terms of the sample size and distillation time they were using (see administrative record for cyanide wastes in today's notice). The Agency is promulgating an amendment to Method 9012 in today's final rule. A sample size of 10 grams and a distillation time of one hour and fifteen minutes should be used in order to comply with this Third Thirds rulemaking. Therefore, the Agency believes that the data in the Second Third rule documenting achievability of the cyanide treatment standard reflects the analytical procedure being promulgated today.

The Agency is not clear on the intended use of the commenter's term "organic" cyanides. If the CN group is ionically charged, Method 9010 will detect virtually all of the free cyanide and almost all of the complexed cyanide. If the CN group is covalently bonded with another carbon, it then becomes a nitro group. If the cyanide is ionically bonded to an organic molecule, then it will be detected by Method 9010. If the CN group is covalently bonded to an organic molecule, it is then no longer a cyanide.

Comment Number: 35 - A-4
Docket Number: LD12 - CC224
Commenter: F. W. Devries
Issue: Cyanides
Subissue: Analytical Methodology
Comment:

2. Practicable Treatment Levels for Weak-Acid-Dissociable Cyanides (III. A.345 and 268.43 - P. 17)

The American Society of Testing and Materials has stated in its standard D-2036 method for cyanide in water that the lower reliable limit of analysis is 0.1 mg/liter for weak-acid dissociable and total cyanides and [illegible].0 mg/liter for cyanides amenable to chlorination. The second citation herein sets a value of 0.028 mg/liter total cyanide. If unanalyzable, how can it be determined if it is achieved?

Further, industrial experience cited by the Du Pont Company, among others, indicates that achieving levels of 0.1 mg/liter after treatment is marginally demonstrable. Since the potable water guideline is at least 0.2 mg/liter free cyanide, the limits of 0.1 appear arbitrary.

Comment Number: 35-A-4

Docket Number: LD12-00231

Commenter: L. E. Lancy

Issue: Cyanides

Subissue: Analytical Methodology

Response:

The Agency disagrees with the commenter regarding the achievability of 0.1 mg/l treatment standard for amenable cyanides in F019 wastewaters. Data submitted to the Agency show that 0.1 mg/l amenable cyanide is attainable through treatment of the waste by alkaline chlorination.

The Agency would like to point out that potable water guidelines are health-based values and the Agency is promulgating technology-based values under the Land Ban Restrictions Program. So the value of 0.1 mg/l is not an arbitrary value.

Comment Number: 35 - B - 1

Docket Number: LD12 - 00229

Commenter: F W. DeVries

Issue: Cyanides

Subissue: BDAT

Comment:

1. Wet Oxidative Treatment of Cyanides (Op. Cit. III. A. 347 in the pre publication copy)

The lack of success in destroying hexacyanoferrates via this kind of chemistry is well known and herein well acknowledged. What is difficult t understand is how the Agency can set post-treatment levels for these compounds, at the same time indicating that these ions are not responsive to the recommended methodology.

It is demonstrated that these very low toxicity compounds (ALD 5000 mg/kg) can release free cyanide under strong ultraviolet attack. However, the source of and justification for the BDAT values in total cyanide (op. cit. III. A. 353) of, in this instance, 21 mg/liter seems arbitrary. Without a proved method to destroy these ions, the achievable technology is likely to be totally a function of feed composition to be treated, and probably will approach the pretreatment concentration following treatment!

This leaves a questionably achievable level, with questionable environmental justification.

Comment Number: 35-B-1
Docket Number: LD12-00229
Commenter: F. W. DeVries
Issue: Cyanides
Subissue: BDAT
Response:

The Agency assumes the commenter is referring to wet air oxidation of cyanides present in K011/K013/K014 wastes because the only cyanide standard set at 21 mg/l was proposed for K011/K013/K014 wastes. These cyanides are present as organo-cyanides, not as iron- or metal-complexed cyanides, as the commenter states erroneously. Additionally, the only data EPA has shows treatment of these organo-cyanides from approximately 2000 ppm to 21 ppm; therefore, the standard of 21 mg/l is not arbitrary, as the commenter has argued.

EPA would conclude, then, that the standard of 21 mg/l is achievable via wet air oxidation and is justified by the data appearing in the Addendum to the K011/K013/K014 Background Document.

Comment Number: 35 - B-2

Docket Number: LD12-00282

Commenter: Circle-Prosco Inc

Issue: Cyanides

Subissue: BDAT

Comment:

7. The Agency has defined BDAT as a destruction technology for cyanides (54 FR 26603). Consequently, treatment standards are based on the analysis of total concentration. The Agency maintains that the best measure of treatment performance is one that reflects the extent to which these cyanides have been destroyed. Since no treatment vendor contacted by us could effectively destroy complexed iron cyanides, we believe any BDAT treatment standards set for this waste would be a measure of iron complex cyanides before treatment, not a measure of the destruction of these iron cyanides.

Comment Number: 35-B-2

Docket Number: LD12-00282

Commenter: Circle-Prosco Inc.

Issue: Cyanides

Subissue: BDAT

Response:

The Agency agrees with the commenter regarding the difficulty in treating complex iron cyanides. However, the Agency's data show destruction of iron cyanide complexes; therefore, the Agency's data support treatment standards being promulgated today using alkaline chlorination. The Agency notes that most commenters who responded to the F019 rulemaking support the selection of alkaline chlorination and the transfer of the standards from the F006-F009 waste.

Comment Number: 35 B-3

Docket Number: LD12-00229

Commenter: F. W. DeVries

Issue: Cyanides

Subissue: BDAT

Comment:

4. Environmental Adequacy of Wet Oxidation of Cyanides in Cyanates (Op. Cit. III. A. 354)

This is a relatively minor concern; however, one hesitates to ignore simple statements, lest they ultimately become precedents. the discussion does not definitively state that it is unnecessary to destroy cyanates by addition of more alkaline hypochlorite, when this reagent is used to destroy cyanide.

Comment Number: 35-B-3

Docket Number: LD12-00229

Commenter: F.W. DeVries

Issue: Cyanides

Subissue: BDAT

Response:

The Agency agrees that technologies exist that will convert cyanide to cyanate but the cyanates will not be further broken down. The Agency believes that destruction or removal techniques will substantially reduce the likelihood of migration of hazardous constituents from the waste so that threats to the environment are minimized. Therefore, the Agency has determined that alkaline chlorination is the best destruction technology available for this waste since it converts cyanide to cyanate, cyanate to cyanogen, and cyanogen to carbon dioxide and nitrogen.

Comment Number: 35 - C - 1
Docket Number: LD12-00282
Commenter: Circle-Prosco Inc
Issue: Cyanides
Subissue: Treatment Standards
Comment:

8. We believe that congressional focus on treatment of cyanides was referring to cyanides from plating and similar operations which produce ionizable cyanides. The Agency cites that iron complexed cyanide in sludges is not a threat to human health (54 FR 31679). These ionizable cyanides are the species which respond to treatment by alkaline chlorination, precipitation, and stabilization, not iron complexed cyanides. Therefore, we further believe that the Agency has erroneously established treatment standards which are applicable to dissociable cyanides rather than complexed iron cyanides.

12. We were able to find two companies, SOLAR/CHEM, THE RAYOX Process, and OZONE SYSTEMS, the ULTROX Process to apply their treatment technology to destroy complex iron-cyanide waste. They sent the residual water to us for analyses. We sent the samples to Lancy Environmental Services, Lancy International, Inc. for analyses according your test methods, 335.1 and 335.2. The results are enclosed.

2 of 2

Comment Number: 52-C-1 (cont)
Docket Number: L012-00252A
Commenter: Circle - Prosco Inc.
Issue: Cyanides
Subissue: Treatment Standards
Comment:

LANCY ENVIRONMENTAL SERVICES
DIVISION OF LANCY INTERNATIONAL, INC.
An Alcoa Separations Technology Company
181 Thorn Hill Road
Warrendale, PA 15086-7527
Phone (412) 772-1239 • FAX (412) 772-1360
(412) 772-1390

ANALYSIS REPORT

Circle - Prosco, Inc.
2017 Yost Ave.
Bloomington, IN 47401

Attention: Clarence W. Gilliam Sr.

Report Date 11/08/89
Sample Date ______ by ______
Received 11/03/89 by FM
Analyzed 11/03 - 11/07/89 by Staff
No. of Samples 2
Purchase Order # 9651

Analysis of Water Samples for Waste Classification

Project #22128

Sample Lab Reference #	Ultrox 9110158 (mg/L)	Rayox 9110159 (mg/L)	Method
Parameter			
Cyanide	32	0.31	EPA 335.2
Cyanide, Amendable	5.0	0.17	EPA 335.1

John Ritzert
C. John Ritzert, Manager-Technical Operations

Comment Number: 35-C-1
Docket Number: LD12-00282
Commenter: Circle-Prosco Inc.
Issue: Cyanides
Subissue: Treatment Standards
Response:

The Agency disagrees with the commenter regarding Congressional focus on cyanides. The Congressional focus was on the treatment of all cyanides. The Agency acknowledges the commenters contention suggesting that iron complex cyanides in sludges is not a threat to human health.

However, EPA wishes to point out that the criteria used by the Land Disposal Restrictions Program to make a determination of toxicity or what is harmful to human health and the environment is not based on the same criteria as that of the Delisting Petition Program. Through the Land Ban Restrictions Program, the Agency has stated that complex iron cyanides are harmful to human health and the environment in both the First Thirds and the Second Thirds final rules.

Therefore, the Agency is promulgating treatment standards based on transfer of standards from alkaline chlorination of F006-F009 to F019 nonwastewaters. These F006-F009 wastes contained high concentrations of complex iron cyanides. These wastes are similar in composition to F019 wastes that also contain high concentrations of complex iron cyanides. F019 wastewaters standards are based on data from the Office of Waters "Development Document for Effluent Limitations Guidelines and Standards for Metal Finishing."

Unfortunately, the Agency is unable to use the submitted data for the following reasons: 1) no Quality Assurance/Quality Control was provided, 2) lack of information regarding the waste, 3) no influent data was provided, and 4) no design and operating procedures were provided. It does appear the Rayox process achieved similar levels of treatment as alkaline chlorination: 1.9 mg/l for total cyanide and 0.1 for amenable cyanide.

Comment Number: 35 D-1
Docket Number: LD12-0-2211
Commenter: F. W. DeVries
Issue: Cyanides
Subissue: Soil/debris
Comment:

5. Reinforcement of the Agency's Cautious Approach on Soil/Debris Issues (III. A. 456)

The approach is commendable. One point re cyanide should be borne in mind as regulations are considered--the high natural incidence of cyanides from plants that may contribute to soils under consideration. Site specific standards may be the only appropriate solution for these issues.

358/9

Comment Number: 35-D-1
Docket Number: LD12-00229
Commenter: F.W. DeVries
Issue: Cyanide
Subissue: Soil/Debris
Response:

The Agency believes that this transfer is technically feasible due to the high concentration of dissolved metals in K062 wastes. The commenter has not provided us with sludge stablization data (to prove that treatment standards are unattainable).